

Travis County Texas

Hazard Mitigation Plan



December 2004

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Executive Summary

Travis County, TX undertook development of this *Hazard Mitigation Plan* (“the Plan”) because of increasing awareness that natural and man-made hazards, especially flood hazards, may affect many people and property in the area. The Plan is a requirement associated with receipt of certain federal mitigation grant program funds administered by the Texas Division of Emergency Management and the Texas Water Development Board. In addition, the Plan is a pre-qualification of eligibility for other mitigation funds.

The Plan was prepared by a Mitigation Planning Committee composed of staff representatives from the Office of Emergency Management, the Transportation & Natural Resources Department (Engineering Planning, Developmental Services, Roads and Bridges, Maintenance, Parks and Natural Resources) and Purchasing. Other county staff contributed. Representatives from three organizations attended meetings as participants: Lower Colorado River Authority (LCRA); Capital Area Planning Council (CAPCO); the Texas Water Development Board (TWDB) and the City of Austin’s Office of Emergency Management. State and federal agencies were notified and invited to attend.

Travis County has experienced a number of hazard events, most resulting in fairly localized damage. Flood hazard areas are found around Lake Travis, Lake Austin, and along the Colorado River. All waterways have areas subject to flooding, and most streams in the County have some existing buildings that are at-risk to flood damage. Located in the southeast quadrant of the County, Precinct 4 has flatter topography and is downstream of watershed areas that have experienced considerable growth and development. Nearly 20-percent of all buildings are exposed to some degree of flooding. Although small wildland fires occur with significant regularity, relatively small areas are affected due to effective response. However, the risk of wildland fire is considered high due to a number of geographic factors and limitations on access in the western part of the County.



This *Hazard Mitigation Plan* sets the stage for long-term disaster resistance through identification of actions that will, over time, reduce the exposure of people and property to natural hazards. Sections of the Plan:

- Provide overviews of the hazards that threaten the County,
- Characterize the people and property that are exposed to some risk due to those hazards,
- Outline the planning process,
- Describe how hazards are recognized in the County's normal processes and functions, and
- Identify the priority of mitigation action items.

It is estimated that nearly 6,800 buildings and many more parcels of undeveloped land in Travis County are located within areas shown on flood hazard maps prepared by the Federal Emergency Management Agency. Of those, fewer than 20% were covered by flood insurance (as of mid-2003).

While flooding has occurred in several locations, severe flooding of Onion Creek has caused repetitive and substantial damage to homes in the Timber Creek subdivision. Onion Creek flows through the southern and southwestern parts of the County. Travis County has received mitigation grant funds to support acquisition and demolition of many homes in the Timber Creek Subdivision along Onion Creek. The initiative is expected to continue as funding becomes available.

The citizens of Travis County will benefit from the Plan in that actions proposed for implementation over the next 5–10 years will reduce exposure to hazards. Four high-priority actions that will directly benefit citizens are:

- Development of a communications plan will improve interactions with the public, both before and after floods.
- Exploring expansion of the City of Austin's flood warning system will increase citizen safety.
- Integrating property parcel maps with the tax database will improve permit administration and support public outreach efforts.
- Continued efforts to identify and implement mitigation options in high-risk areas will reduce future losses.

A public meeting was held near the beginning of the mitigation planning process to introduce the County's citizens to the concept of mitigation planning and to invite public comment. The final draft plan was scheduled to be presented at another public meeting and was made available for comment on the County's web site, in County facilities, and in public libraries. The final Plan was presented at a public meeting of the Commissioners Court on June 17, 2003, and is effectively immediately.

The Plan was submitted to the Texas Division of Emergency Management by Pete Baldwin, Travis County Emergency Management Coordinator (phone: (512) 854-4242; FAX: (512) 854-6471; email: Pete.Baldwin@co.travis.tx.us). Copies of the adopted plan are available for review at the Travis County Office of Emergency Management located at 314 West 11th Street, Austin, Texas 78701.

Resolution of Adoption

RESOLUTION



WHEREAS Travis County, Texas has experienced natural hazards that result in public safety hazards and damage to private and public property;

WHEREAS the hazard mitigation planning process set forth by the State of Texas and the Federal Emergency Management Agency offers the opportunity to consider natural hazards and risks, and to identify mitigation actions to reduce future risk;

WHEREAS the State of Texas is providing federal mitigation funds to support development of the mitigation plan;

WHEREAS a *Hazard Mitigation Plan* has been developed by the Mitigation Planning Committee;

WHEREAS the *Hazard Mitigation Plan* includes a prioritized list of mitigation actions including activities that, over time, will help minimize and reduce safety threats and damage to private and public property, and

WHEREAS two public meetings were held on February 11 and 12, 2003, to introduce the planning concept and to solicit questions and comment; and a public meeting was held on May 28, 2003, to present the Plan and request comments, as required by law,

NOW THEREFORE BE IT RESOLVED by the Commissioners Court of Travis County that:

1. The *Hazard Mitigation Plan* is hereby adopted as an official plan of Travis County, TX; minor revisions recommended by the Texas Division of Emergency Management and the Texas Water Development Board may be incorporated without further action.
2. The County offices identified in the Plan are hereby directed to pursue implementation of the recommended high priority activities that are assigned to their agencies.
3. Any action proposed by the Plan shall be subject to and contingent upon budget approval, if required, which shall be at the discretion of the Travis County



Commissioners Court, and this resolution shall not be interpreted so as to mandate any such appropriations.

4. The Travis County Office of Emergency Management is designated to coordinate with other offices and shall periodically report on the activities, accomplishments, and progress, and shall prepare an annual progress report to be submitted to the Texas Division of Emergency Management and the Texas Water Development Board. The status reports shall be submitted by July 1 of each year.
5. The Transportation and Natural Resources Department shall provide progress reports to the Office of Emergency on mitigation actions and activities that fall within its scope of work.
6. The Travis County Office of Emergency Management is designated to maintain this plan in coordination with the Transportation and Natural Resources Department. Plan maintenance will include annual progress meetings with the Mitigation Planning Committee and a comprehensive plan review and update every five years.

Introduced, read and passed by affirmation vote on this 17th day of June, 2003.

A handwritten signature in cursive script, reading "Samuel T. Biscoe".

SAMUEL T. BISCOE
County Judge

A handwritten signature in cursive script, reading "Ron Davis".

RON DAVIS
Commissioner, Precinct One

A handwritten signature in cursive script, reading "Karen Sonleitner".

KAREN SONLEITNER
Commissioner, Precinct Two

A handwritten signature in cursive script, reading "Gerald Daugherty".

GERALD DAUGHERTY
Commissioner, Precinct Three

A handwritten signature in cursive script, reading "Margaret J. Gomez".

MARGARET J. GÓMEZ
Commissioner, Precinct Four

1.1 Introduction

Travis County, TX undertook development of this *Hazard Mitigation Plan* (“the Plan”) because of increasing awareness that natural and man-made hazards, especially flood hazards, may affect many people and property in the area. The Plan is a requirement associated with receipt of certain federal mitigation grant program funds administered by the Texas Division of Emergency Management and the Texas Water Development Board. In addition, the Plan is a pre-qualification of eligibility for other mitigation funds.

1.2 Authority

The Transportation & Natural Resources Department is designated by the Commissioners Court to coordinate with other appropriate departments and agencies to facilitate the development of the Plan in conformance with state and federal guidelines.

The Plan was prepared pursuant to the Flood Mitigation Assistance Program (44 CFR 78.6), the Hazard Mitigation and Pre-Disaster Mitigation Programs (44 CFR Parts 201 and 206), and the process outlined in materials prepared by the Federal Emergency Management Agency for the Community Rating System of the National Flood Insurance Program.

1.3 Planning Area

This Plan is prepared for the unincorporated areas of Travis County. Thus, it does not cover the City of Austin (the state capital and county seat that occupies the center of the County) or the 19 incorporated local jurisdictions that lie within the County:

- | | | |
|-------------------------|----------------------------|---------------------------|
| ▪ City of Austin | ▪ City of Lago Vista | ▪ City of Rollingwood |
| ▪ Village of Bee Cave | ▪ Village of Lakeway | ▪ Village of San Leanna |
| ▪ Village of Briarcliff | ▪ City of Manor | ▪ City of Sunset Valley |
| ▪ Village of Cedar Park | ▪ City of Mustang Ridge | ▪ Village of Webberville |
| ▪ City of Creedmoor | ▪ City of Pflugerville | ▪ City of West Lake Hills |
| ▪ City of Elgin | ▪ Village of Point Venture | ▪ Village of Volente |
| ▪ City of Jonestown | | |



1.4 Geography, Climate, and Population

Travis County is located in Central Texas, 150 miles inland from the Gulf of Mexico (Figure 1-1). The County's geographic features are relatively diverse. The northern and western portions are characterized by the hilly and rugged topography of the Edwards Plateau and the Balcones Escarpment. The remainder of the County is characterized by the gently rolling hills and plains of the Blackland Prairies to the east and the Gulf Coast Plains to the south. Travis County consists of 1,024.8 square miles (including incorporated areas). The hilly topography of the far western part of the County limits new development, leading to greater activity in those areas which contain more land that is subject to flooding.

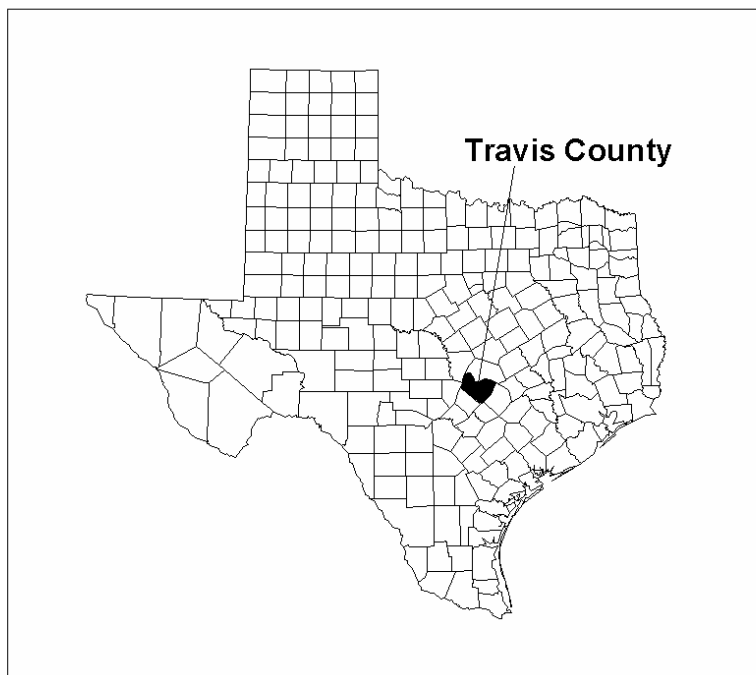


Figure 1-1. State of Texas, Travis County.

Soils throughout the County reflect the geographic diversity. Calcareous stony clays and some clay loams are found in the Edwards Plateau region. Moving eastward into the southern plains, the soils grade into dark calcareous clays interspersed with acidic sandy loams.

The climate of the region is humid subtropical, with hot summers and relatively mild winters. A wide variation between maximum and

minimum temperatures is experienced due to the interplay of warm and humid weather moving northward from the Gulf of Mexico and strong, polar fronts from the north. Prevailing winds are from the southeast and frequently persist for several days. The strongest winds are from the north, with recorded wind speeds in excess of 50 miles per hour.

Generally, the heaviest precipitation occurs as thunderstorms in late spring or early fall, and often is associated with tropical systems and hurricanes moving through the region. Rainfall averages about 33 inches per year and, although evenly distributed, the heaviest occurs in late spring or early fall, with much of it a direct result of thunderstorm activity associated with seasonal cold fronts.

1.4.1 Population and Growth

The estimated population for the Austin-Travis County metro area for the year 2000 is 812,280, a 41% increase since 1990 (U.S. Census Bureau). The population of the unincorporated area is estimated to be 165,539 (based on households and average 2.47 occupants). For the region, the average population density is 821 persons per square mile (statewide average is 79.6 persons per square mile). The Texas Department of Human Services reports 14,473 births and 3,998 deaths in 2000. This rapid population increase contributes to development pressure and has the potential for long-lasting impacts on the quality of life.

Travis County is partitioned into four precincts for the purpose of election of and representation by precinct commissioners. As of 2002, the geographic boundaries of the precincts are as shown in Figure 1-2. Table 1-1 shows population and approximate number of buildings in each precinct. Buildings are grouped by size. Although not a definitive characterization, it is reasonable to assume that buildings with a footprint of more than 4,000 square feet are likely to be non-residential or multi-family residential buildings.

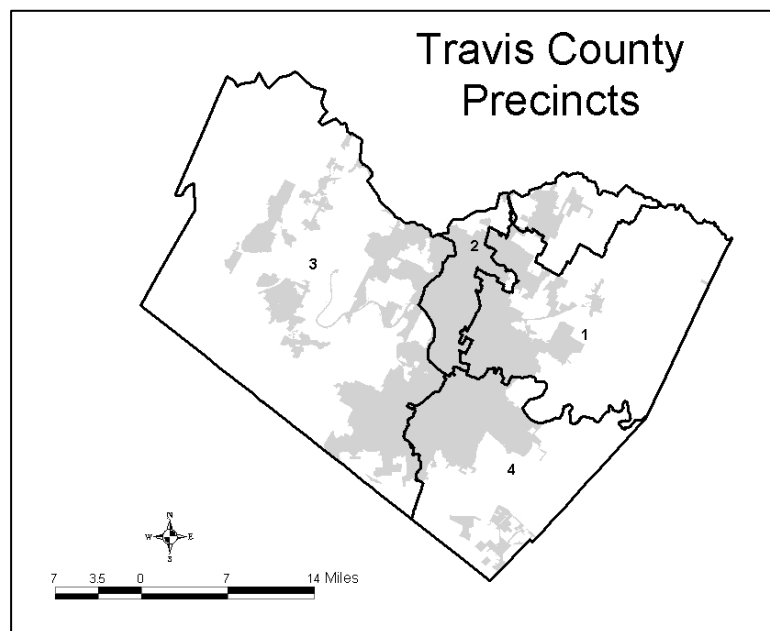


Figure 1-2. Travis County Precincts.

**Table 1-1
Population and Buildings, by Precinct.**

	Precinct 1	Precinct 2	Precinct 3	Precinct 4
Population (Austin/Travis metro)	193,357	210,919	211,332	196,672
Population (estimated for unincorporated Travis – see text)	30,653	24,749	83,733	26,404
Buildings (smaller than 4,000 sf)	12,410	10,020	33,900	10,690
Buildings (larger than 4,000 sf)	590	480	3,100	610

Based on the results of the 2000 census, the Austin metro area is estimated to have a total of 335,881 housing units (up from 264,173 in 1990). The bulk of homes are 10–30 years old (see Figure 1-3). This is notable because the County began managing mapped floodplain areas in March 1982, thus homes in flood hazard areas should be reasonably

protected through elevation. In 2000, the median value of owner-occupied housing units was \$134,700.

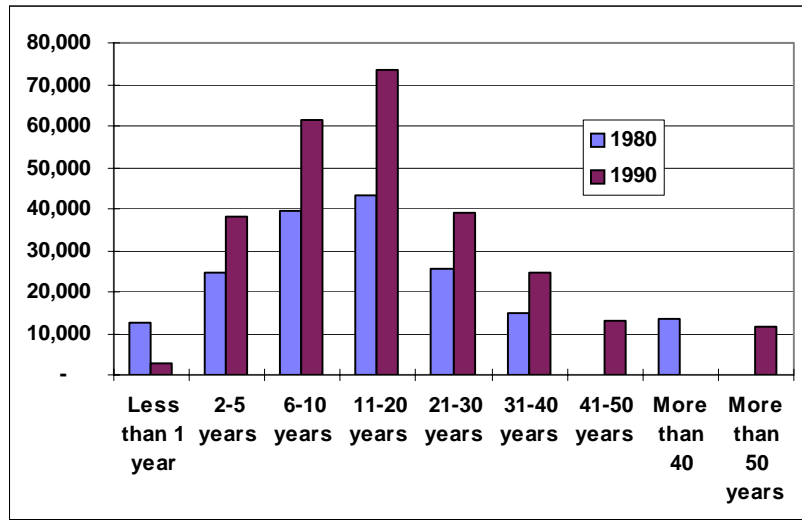


Figure 1-3. Average Age of Homes, Austin Metro.

Travis County surrounds the City of Austin, the state capital. The information provided in Table 1-2, based on labor force figures from the Texas Workforce Commission for the year 2001, indicates that employment is not dominated by any single industry. Unemployment in March 2002 was 5.4%, compared to 2.4% in March 2001.

**Table 1-2
Employment, by Industry.**

Industry	Percentage
Trade, Transportation & Utilities	16%
Professional & Business Services	15%
Manufacturing	12%
State Government	11%
Industries employing <10 employees (education & health, leisure & hospitality, local government, financial activities, construction, information, federal government, natural resources, & mining, and other & non-classifiable)	54%



1.4.2 Special Consideration Communities

For the purpose of this plan, Travis County, TX, is not a “special consideration community.” The federal government defines special consideration communities to be those with 3000 or fewer individuals that is a rural community, and is not a remote area within the corporate boundaries of a larger community. Such communities are economically disadvantaged, with residents having an average per capita annual income not exceeding 80% of the national per capita income, based on best available data. Further, special consideration communities have a local unemployment rate that exceeds by one percentage point or more, the most recently reported, average national unemployment rate.

The Austin/Travis County Health and Human Services Department noted that just over 95,000 residents (15%) were living at or below the poverty level in a 1996 report of the Texas Department of Human Services. In 1998, the “federal poverty level” was defined as incomes of \$8,040 (individual) and \$16,450 (family of four) per year. Service gaps to low-income residents, including legal immigrants, were identified. Gaps included a shortage of subsidized housing and affordable housing. Since 1990, average rental costs in the area increased 12–16% per year, while construction of new rental units declined. The number of housing units without plumbing was reported to have steadily declined, from 1.2% in 1980 to 0.5% in 1990.

1.4.3 Land Use and Development

The State of Texas has not specifically authorized counties to develop and adopt comprehensive plans for land use or zoning. Therefore, Travis County does not use these development tools. However, as detailed in Table 6-1, development permits are the clearest indication of land use and development trends throughout Travis County. For calendar year 2001, a total of 2,381 development permits were issued (9% in Precinct 1, 38% in Precinct 2, 37% in Precinct 3, and 16% in Precinct 4). For calendar year 2002, a total of 3,033 development permits were issued (20% in Precinct 1, 21% in Precinct 2, 39% in Precinct 3, and 21% in Precinct 4). Thus, Precinct 3 in the west, including Lake Travis, is experiencing the greatest growth.

1.5 Planning Committee Membership

The following County departments and offices are designated members of the Mitigation Planning Committee:

- Office of Emergency Management
- TNR, Engineering Division (Planning Office; Grants)
- TNR, Development Services (Permits; Engineering)
- TNR, Roads & Maintenance Division
- Parks & Natural Resources Division (Park Planning)
- Parks & Natural Resources Division (Natural Resources Program)
- Purchasing

Representatives from the following organizations attended Mitigation Planning Committee meetings as advisory participants:

- Lower Colorado River Authority (LCRA)
- Capital Area Planning Council (CAPCO)
- City of Austin, TX, Office of Emergency Management

The following agencies were notified, invited to participate, and asked to review and comment on the Plan:

- Texas Division of Emergency Management
- Texas Water Development Board
- Federal Emergency Management Agency – Region VI
- Texas Parks & Wildlife
- Texas General Land Office
- Texas Commission on Environmental Quality

1.6 Acknowledgments

The Plan was supported by planning grant funds provided by the Federal Emergency Management Agency and administered by the Texas Division of Emergency Management and the Texas Water Development Board. Travis County appreciates the advice and encouragement of both agencies.



The Travis County *Hazard Mitigation Plan* was facilitated by Donald R. Ward & Associates, Naples, FL, with support from RCQuinn Consulting, Inc., Annapolis, MD (www.rcquinnconsulting.com).

1.7 References & Key Terms

References cited in the Plan are listed in Appendix A.

For the most part, terms used in the Plan have the meanings that are commonly associated with them:

- **Disaster** means the occurrence of widespread or severe damage, injury, loss of life or property, or such severe economic or social disruption that supplemental disaster relief assistance is necessary for the affected political jurisdiction(s) to recover and to alleviate the damage, loss, hardship, or suffering caused thereby (DEM).
- **Federal Emergency Management Agency (FEMA)** coordinates the federal government's efforts to plan for, respond to, recover from, and mitigate the effects of natural and man-made hazards.
- **Flood Insurance Rate Map (FIRM)** is prepared by the Federal Emergency Management Agency to show Special Flood Hazard Areas; this map is the basis for regulating development according to the Regulations for Flood Plain Management (Travis County Code, Chapter 64) and Standards for Construction of Streets and Drainage in Subdivisions (Travis County Code, Chapter 82).
- **Floodplain:** See "Special Flood Hazard Area (SFHA)" below.
- **Hazard** is defined as the natural or technological phenomenon, event, or physical condition that has the potential to cause property damage, infrastructure damage, other physical losses, and injuries and fatalities.
- **Mitigation** is defined as actions taken to reduce or eliminate the long-term risk to life and property from hazards. Mitigation actions are intended to reduce the *need* for emergency response – as opposed to improving the *ability* to respond.
- **National Flood Insurance Program (NFIP)**, located within FEMA, is charged with preparing FIRMs, developing regulations to guide development, and providing insurance for flood damage.
- **Risk** is defined as the potential losses associated with a hazard. Ideally, risk is defined in terms of expected probability and frequency of the hazard occurring, people and property exposed, and potential consequences.

-
- **Special Flood Hazard Area (SFHA) or Floodplain** is the area adjoining a river, stream, shoreline, or other body of water that is subject to partial or complete inundation. The SFHA is the area predicted to flood during the 1% annual chance flood, commonly called the “100-year” flood.

1.8 Acronyms

The following acronyms are used in the document:

- **CAPCO** – Capital Area Planning Council
- **CRS** – Community Rating System (NFIP)
- **DEM** – Texas Division of Emergency Management
- **EAP** – Emergency Action Plan (for dams)
- **EOC** – Emergency Operations Center
- **ESD** – Emergency Service District
- **FEMA** – Federal Emergency Management Agency
- **FEWS** – Flood Early Warning System
- **FIRM** – Flood Insurance Rate Map
- **FIS** – Flood Insurance Study
- **FMA** – Flood Mitigation Assistance (FEMA)
- **GIS** – Geographic Information System
- **HMGP** – Hazard Mitigation Grant Program (FEMA)
- **LCRA** – Lower Colorado River Authority
- **NFIP** – National Flood Insurance Program (FEMA)
- **NOAA** – National Oceanic and Atmospheric Administration
- **OEM** – Office of Emergency Management (within the Travis County Department of Emergency Services)
- **SFHA** – Special Flood Hazard Area
- **TCEQ** – Texas Commission on Environmental Quality
- **TNR** – Travis County Transportation & Natural Resources
- **TWDB** – Texas Water Development Board
- **TXDOT** – Texas Department of Transportation

Part 2

Introduction to Mitigation Planning

2.1 Introduction

An important step in the lengthy process of improving resistance to hazards is the development of a hazard mitigation plan. The Travis County *Hazard Mitigation Plan* was prepared in accordance with the guidelines provided by the Federal Emergency Management Agency, advice from the Texas Division of Emergency Management and the Texas Water Development Board (TWDB), and steps outlined in guidance documents for the National Flood Insurance Program's (NFIP) Community Rating System.

The *Hazard Mitigation Plan* serves several purposes. It sets the stage for long-term disaster resistance through identification of actions that will, over time, reduce the exposure of people and property to hazards. In addition, if the County elects to seek recognition under the NFIP's Community Rating System, the Plan will provide additional credit. Further, the Plan may establish eligibility for certain mitigation grant funds.

Sections of the Plan provide overviews of the natural hazards that threaten the County, the people and property exposed to those hazards, the planning process, how hazards are recognized in the County's normal processes and functions, and priority mitigation action items. The hazards summary and disaster history help to characterize future hazards. In terms of sheer numbers, more wildfire incidents occur. However, when magnitude of past events, the number of people and properties affected, and the severity of damage is taken into account, flood hazards clearly are the most significant natural hazard to threaten Travis County. Therefore, this Plan concentrates primarily on flood hazards.

This Plan acknowledges that many buildings were built before the adoption of regulations for development in floodplains of the County's lakes and waterways. Current regulations require new development to recognize reasonably anticipated flood hazards. Older buildings, then, may reasonably be expected to sustain more property damage than new buildings.



2.2 The Mitigation Planning Process

Travis County followed a well-established planning process to develop this *Hazard Mitigation Plan* and to fulfill multiple requirements. Four meetings of the Mitigation Planning Committee were held (summary notes from meetings are in Appendix B):

- **July 16, 2002.** Overview of the mitigation planning process, prevalent natural hazards, losses and costs associated with events, discussion of opportunities for public comment, introduction to examples of mitigation actions.
- **September 12, 2002.** Review agency roles and responsibilities, overview of number of buildings (public/private) that are “in” the floodplain, review how hazards are handled by each agency, discuss specific examples of losses identified during interviews, draft mitigation goal statement, identify each program’s mechanisms for communicating with the public, initiate review of possible mitigation actions based on local risk.
- **October 24, 2002.** Review additional data on properties at risk (by precinct and by watershed). Sixty-eight HazMat sites and one fire station (#1108) are mapped as located in the floodplain. The draft mitigation goal statement was reviewed and revisions discussed. The list of potential mitigation actions was reviewed to understand intent and to determine whether to keep for further consideration, modify, or eliminate. The work remaining was reviewed.
- **May 28, 2003.** Review preliminary comments from the draft plan review meeting with the Texas Division of Emergency Management. The priority of the mitigation actions was discussed and resulted in moving one item from medium to high priority. Each high priority mitigation action was discussed in order to: determine assignment of lead/support agency; an assessment of political and community acceptance; funding and limitations; and cost effectiveness. For each high priority action, the Committee assigned it to the elements of the mitigation goal statement and concluded that the actions will result in reasonable progress towards the goal. The draft resolution of adoption was reviewed and the plan was approved and forwarded to Commissioners Court for adoption.

The overall mitigation planning process, summarized below, was facilitated by a mitigation planning consultant:

- **Get Organized:** the Travis County Department of Transportation & Natural Resources (TNR) was charged by the Commissioners Court with coordinating a committee comprised of County departments that are responsible for drainage permits, subdivision approvals,

community development, parks and recreation, roads and bridges maintenance, public facilities, and emergency management.

- **Coordinate:** Prior to the first Committee meeting, the following agencies were notified of the planning activity and invited to participate:
 - Texas Division of Emergency Management, Texas Water Development Board, and the Texas Commission on Environmental Quality (which coordinates the National Flood Insurance Program).
 - The Lower Colorado River Authority (Section 8.5) and the Texas Colorado River Floodplain Coalition (Section 8.6).
 - FEMA Region VI, U.S. Army Corps of Engineers (Ft. Worth District), and the Natural Resource Conservation Service (Travis Conservation).
- **Identify Hazards:** Interviews were conducted to understand how members of the Committee perceive the impacts that past events have had and how hazards are incorporated into routine responsibilities. (Detailed notes on the interviews are included in Appendix C). Maps can be used to show hazard-prone areas when hazards are defined with sufficient detail to show spatial or geographic differences in impact. Flood hazards are the most easily identified, due to the availability of Flood Insurance Rate Maps for the County. Within an area the size of the County, there are not enough geographic differences to suggest that high winds or tornadoes might affect some areas more severely or more frequently than in others. Similarly, the threats of severe winter snow loads and ice are expected to affect the County uniformly. If studies are available, dam failure impact areas can be mapped. Hazardous materials are generally confined to fixed facilities or within defined transportation corridors; thus, maps can be prepared to show anticipated impact areas.
- **Review How Hazards are Addressed:** During interviews with the Mitigation Planning Committee representatives, the roles of each program were described with respect to whether and how hazards are included in routine functions. The results are summarized in Section 6.2 and Appendix C. Particular attention was paid to administration of the Regulations for Floodplain Management and Guidelines and Procedures for Development Permits (Travis County Code, Chapter 64) and Standards for Construction of Street and Drainage in Subdivisions (Travis County Code, Chapter 82). Travis County does not administer a building code.
- **Assess Risks:** For the purpose of this Plan, site-specific and detailed risk assessments were not prepared. The best floodplain mapping information available as of mid-2002 is from the Flood Insurance Study and associated Flood Insurance Rate Maps. FEMA has



prepared a Q3 Digital Flood Data layer so that mapped flood hazard areas are useable in the County's Geographic Information System.

- **Create Goal Statement:** The mitigation goal statement was discussed during the second meeting of the Committee, and approved at the third meeting.
- **Review Mitigation Actions:** A list of tentative mitigation actions was prepared based on meetings and interviews as well as knowledge of successful actions implemented in other communities. The list was distributed to the Committee and discussed in some detail during the third meeting. Some actions were combined and one was removed from consideration (with justification). A revised list was distributed to the Committee, and members were asked to indicate priorities (Drop, No Opinion, Low, Medium, High) based on their program's functions and priorities. The priorities are shown in Part 7.
- **Draft Action Plan:** Information collected and notes from meeting discussions were compiled into a format designed to fulfill various planning requirements. The draft was circulated to Mitigation Planning Committee members and electronic copies were provided to adjacent communities and pertinent state and federal agencies. Comments were collected and incorporated and a final draft was circulated.
- **Hold Public Meetings:** The public and adjacent communities were notified of all public meetings. Two meetings were held on February 11–12, 2003 to introduce the planning process to interested citizens and to solicit comments. In mid-May, the draft *Hazard Mitigation Plan*, including proposed mitigation actions, was made available for public review. The final Plan was presented at the public meeting held on May 28, 2003. Although this meeting was well advertised, no one from the public attended. Additional detail is provided in Section 2.2.
- **Review Draft Plan with State:** Members of the Mitigation Planning Committee met with mitigation staff of the Texas Division of Emergency Management to review the Draft Plan and the FEMA/Texas crosswalk. Suggestions were made and a number of specific areas were discussed in order to ensure the Plan addresses the minimum requirements.
- **Adopt Plan:** A copy of the resolution of adoption is bound into this Plan.

2.3 Public Involvement in Mitigation Planning

To introduce the mitigation planning process to the public and solicit public comments during the drafting of the Plan, two public meetings were held on February 11 and 12, 2003.

2.3.1 Introductory Public Meetings

Materials used for outreach are included in Appendix D and included:

- Advertisement in the Sunday editions of the *Austin American-Statesman*, (February 2 and February 9);
- Issuance of the public notice to the print and broadcast media;
- Posting of the public notice and the hazard questionnaire on the County's Web page;
- Mailing 409 individual copies of the public notice to individuals and County residents who have filed flood insurance claims; and
- Mailing the public notice to various organizations and local regional and state agencies; FEMA Region VI; elected officials; and mayors and city managers of the adjacent local jurisdictions listed in Section 1.3. Appendix D lists the organizations, agencies, and elected officials receiving the notice.

A questionnaire was made available online and distributed at the meetings. Twenty-one citizens returned the form. The form and summaries of the responses are included in Appendix D. Oral comments made and responses provided are summarized in Appendix D and included:

- How the Lower Colorado River Authority manages water levels and how that influences flooding.
- Accuracy of FEMA's Flood Insurance Rate Maps and how frequently they are revised.
- Why have we seen two 100-year floods in the past 10 years?
- Why is my flood insurance so high?
- Will the plan identify the feasibility of specific mitigation projects?
- What funding sources is Travis going to qualify for when this plan is completed?
- Is the County considering anything other than buyouts for the Timber Creek subdivision?



- Why weren't Timber Creek properties flooded in November 2001 part of the buyout?
- Properties in Walnut Place, along Walnut Creek, continue to be affected by erosion; citizens continue to express concern over what is happening.

2.3.2 Commissioners Court Work Session

Travis County TNR presented an overview of the planning process and summary of the draft plan to the Commissioners Court in a public work session on April 17, 2003. The Commissioners approved release of the draft plan for public review in a voting session held on April 22, 2003.

All work sessions and voting sessions are open to the public and are televised on the Travis County Government Access Cable channel (TCTV channel 17). Most sessions are rebroadcast three or four times. Subsequent to the work session, Mitigation Planning Committee members were interviewed on radio on three occasions (KLPI AM news radio).

2.3.3 Final Public Meeting

The Travis County, TX, *Hazard Mitigation Plan* (Public Review Draft) was scheduled to be presented at a public meeting on May 28, 2003. The Committee used many avenues to keep the public informed during the plan development and to provide opportunities for the public to participate and provide input and comments:

- The County's web page hosted notices of public meetings, notice of availability of the Plan, and the Plan was posted for downloading.
- Copies of the Public Review Draft were made available to the public in TNR offices and at the John Henry Faulk Public Library, the Manchaca Branch Library, and the Spicewood Springs Library.
- State agencies, FEMA Region VI, adjacent communities, and other interested organizations were notified.

Although the meeting was advertised on the County's web site and in the *Austin American Statesman*, no one from the public attended. One comment was received via email from a resident of a community that experiences flooding from Onion Creek. A number of local concerns were identified (creek bed erosion, build up of sediment, local drainage ditches). The commenter acknowledged that "due to limited resources, priorities must be targeted for remediation of hazardous areas" and urged

that the County consider “assisting neighborhood associations to apply for and acquire Hazard Mitigation Grants that would prevent additional flooding and storm hazards.”

2.3.4 Public Session of Commissioners Court

The *Hazard Mitigation Plan* was presented for adoption during the June 17, 2003 public meeting of the Commissioners Court, effective immediately. The Office of Emergency Management, with the support of Transportation & Natural Resources, was directed to forward the Plan to the Texas Water Development Board and the Texas Division of Emergency Management for appropriate review and action.

2.4 The State Mitigation Plan

The State of Texas has long been aware that it is exposed to a variety of natural hazards. Of particular concern are flood hazards associated with thunderstorms, hurricanes, and tropical storms. The *State of Texas Hazard Mitigation Plan* (January 2000) (accessible online at <http://www.txdps.state.tx.us/dem>) was reviewed and is summarized below.

Originally prepared by the Texas Division of Emergency Management to fulfill the requirements set forth by Congress in the Stafford Act (Section 409), the state’s *Hazard Mitigation Plan* will be reviewed and revised to satisfy new planning requirements prompted by the Disaster Mitigation Act of 2000.

The state’s plan acknowledges that people and property in Texas are at risk from a variety of hazards that have the potential to cause widespread loss of life and damage to property, infrastructure, and the environment. The plan “establishes hazard mitigation goals, strategies, and specific measures designed to reduce the occurrence or severity of the consequences of hazards.” It also documents procedures for implementation and administration of certain mitigation grant programs.

The State Hazard Mitigation Team is designated to coordinate and influence mitigation and is composed of several agencies that participate on the Emergency Management Council. Primary agencies are the Texas Department of Housing and Community Affairs; Texas Parks and



Wildlife Department; Texas Department of Environmental Quality (formerly the Texas Natural Resource Conservation Commission); Texas Department of Transportation, General Land Office; Railroad Commission of Texas; Texas Department of Insurance; Texas Forest Service; Texas Engineering Extension Service; and Texas Division of Emergency Management. Brief summaries of each of these primary agencies are provided, noting key natural hazard mitigation measures associated with each agency. For the most part, existing measures are ongoing agency functions and responsibilities.

As currently structured, the *State of Texas Hazard Mitigation Plan* contains attachments outlining specific strategies for dealing with hazards related to floods, wildfires, and tornadoes. Strategies particularly pertinent to local jurisdictions are described below:

- **Flood Mitigation.** Eleven percent of the state's land area is mapped as flood-prone, with an estimated 675,000 households located in these areas. Mitigation recommendations include:
 - Passage by the Texas Legislature of new laws that create/mandate sound floodplain management by all political subdivisions.
 - That all owners of dams, levees, floodwalls and other protective works conduct studies to evaluate effectiveness and soundness and to incorporate evacuation and warning into operations plans.
 - Implementation of a statewide information and education program, with local emphasis, to address sale of flood insurance and public awareness.
 - Seek broader authority to protect, restore, and preserve natural and cultural floodplain resources.
- **Wildfire Mitigation.** In an average year, 1.5 million acres burn in Texas. Many areas are vulnerable to wildfire during dry years, although those with very sparse vegetation are less likely to burn due to low quantities of fuel. Mitigation recommendations include:
 - Development of a statewide wildfire reporting system.
 - Establishment of mutual aid agreements and improvements in training.
 - Installation of automated weather systems at key locations.
 - Assistance to rural communities via centralized purchasing and development of dry hydrants.

-
- **Tornado Mitigation.** Texas tornadoes occur with greatest frequency during the spring and early summer months, with the majority occurring in April, May, and June. Mitigation recommendations include:

- Promotion of expanded normal peril and windstorm insurance.
- Promotion of enhanced public awareness.
- Adoption and enforcement of building codes and/or design criteria, especially for shelters in public facilities, schools, and mobile home parks.
- Enhancement of warning capabilities to ensure that +90% of the state's population receives accurate and timely warnings to allow adequate response.

2.5 Federal Mitigation Planning Requirements

Requirements for mitigation planning are set forth in four programs administered by the Federal Emergency Management Agency. These are described below. Although slightly different, all programs outline the same basic planning process (described in Section 2.2). The Travis County Plan is intended to satisfy the basic requirements each of the four programs:

- **Flood Mitigation Assistance Program.** To qualify to receive grant funds to implement projects such as acquisition or elevation of flood-prone homes, local jurisdictions must prepare a mitigation plan. The plan must include specific elements and be prepared following the process outlined in the NFIP's Community Rating System.
- **Hazard Mitigation Grant Program.** By November 2004, to qualify for post-disaster mitigation funds local jurisdictions must adopt a mitigation plan that is approved by FEMA.
- **Pre-Disaster Mitigation Grant Program.** By November 2003, to qualify for pre-disaster mitigation funds local jurisdictions must adopt a mitigation plan that is approved by FEMA.
- **NFIP's Community Rating System (CRS).** The CRS offers recognition to communities that exceed minimum requirements of the National Flood Insurance Program. Recognition comes in the form of discounts on flood insurance policies purchased by citizens. The CRS offers credit for mitigation plans that are prepared according to a multi-step process.

Part 3

Mitigation Goal Statements

3.1 Introduction

State and federal guidance and regulations pertaining to mitigation planning require the development of mitigation goals to reduce or avoid long-term vulnerabilities to identified hazards. Mitigation goals have been established by the Federal Emergency Management Agency, the Texas Division of Emergency Management, and Travis County.

3.2 Travis County's Mitigation Goal

As required by the planning process, the Mitigation Planning Committee developed a goal statement. To do so, the Committee reviewed FEMA's national mitigation goals, Travis County's Mission Statement, several examples of goal statements from other states and communities, and the State of Texas' Mitigation Goal. The committee also considered information about natural hazards that may occur in the County and their potential consequences and losses. The final mitigation goal statement is as follows:

Travis County Mitigation Goal Statement

It is the goal of Travis County to protect public health, safety, and welfare and to reduce losses due to hazards by identifying hazards, by minimizing exposure of citizens and property to hazards, and by increasing public awareness and involvement.

Elements of a mitigation goal statement were discussed and the committee agreed that the following were important concepts to address:

- Capture the sense of “reduce the tremendous costs associated with response and recovery.”
- Focus on public and private property damage reduction.

The value of making goal statement broad allows for more comprehensive interpretation of its phrases, for example:

- “Minimizing exposure” is broad enough to include the concept of applying development controls (permits) to avoid development in floodplains and, if avoidance is not feasible, to build according to



regulations that reduce the potential for damage. The phrase is also broad enough to include undertaking projects intended to deal with specific properties, such as administering grants for acquisition, protecting park buildings, or working with others if a structural flood control project is deemed appropriate.

- “Losses” is a broad term and includes public and private property damage (including physical property damage as well as economic loss by having insurance), agricultural losses, business interruption, environmental damage, injury and loss of life.
- “Public Awareness and Involvement” can include helping citizens to understand hazards, to know how to respond when asked to evacuate, to learn how to protect themselves and their property, to understand the value of flood insurance, and to obtain and comply with permit requirements.

Prior to and independent of the need to adopt a mitigation goal statement, Travis County established a broad mission statement to guide its long-term and short-term actions:

Travis County Mission Statement

To preserve health, provide a safety net for the needy, ensure the public safety, facilitate the resolution of disputes, foster an efficient transportation system, promote recreational opportunities, and manage County resources in order to meet the changing needs of the community in an effective manner.

3.3 State of Texas Mitigation Goals

The Texas Division of Emergency Management (DEM) is designated by the Governor as the state’s coordinating agency for disaster preparedness, emergency response, and disaster recovery assistance. DEM also is tasked to coordinate the state’s natural disaster mitigation initiatives and administer grant funding provided by the Federal Emergency Management Agency. A key element in that task is the preparation of the

State of Texas Hazard Mitigation Plan (Rev 2, 2000). The state's plan includes a series of mitigation goals, as follows:

Texas State Mitigation Goals

- *Reduce or eliminate hazardous conditions that cause loss of life;*
- *Reduce or eliminate hazardous conditions which inflict injuries;*
- *Reduce or eliminate hazardous conditions which cause property damage; and*
- *Reduce or eliminate hazardous conditions which degrade important natural resources.*

Texas Hazard Mitigation Plan (2000)

3.4 FEMA's Mitigation Goal

FEMA's mitigation strategy is set forth in a document originally prepared in the late 1990s. This strategy is the basis on which FEMA implements mitigation programs authorized and funded by the U.S. Congress. The national mitigation goal statement is as follows:

FEMA's Two-Part Mitigation Goal

To engender fundamental changes in perception so that the public demands safer environments in which to live and work; and

To reduce, by at least half, the loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from natural disasters.

Part 4

Hazards in Travis County

4.1 Introduction

As part of its efforts to support and encourage hazard mitigation initiatives, the Texas Division of Emergency Management prepared an assessment of hazards that have caused or have the potential to cause disaster situations in communities throughout the State of Texas. Results of the study are found in the *State of Texas Hazard Assessment (2000)*.

Of the 62 Presidential Disaster Declarations that Texas received between 1961 and 2000, 33 were for floods, 14 for tornadoes, 11 for hurricane/tropical storms, and four were designated “other.”

The Travis County Office of Emergency Management maintains a qualitative overview of hazards and events, titled *Hazard Analysis for Travis County* (updated November, 1999). For eight types of hazards, the report lists the number of occurrences between 1990 and 1998, and ranks each hazard with regard to the County’s overall vulnerability to that hazard (high, medium, low). Based on this qualitative overview, the eight hazards and their associated rankings were reported to be:

- Wildland, grass/brush fire – high (due to the high number of occurrences and potential to occur anywhere in the County)
- Floods – medium (due to nature of hazard as occurring along waterways)
- Tornadoes – medium
- Hazardous materials – medium
- Drought – low
- Severe storms – low
- Winter storms – low

In comparing different hazards, it is important to understand relative impacts. For example, a severe winter storm would certainly affect nearly everyone in the area, but it would be unlikely to cause widespread significant property damage. Tornadoes typically have very limited impact areas; but property damage tends to be extreme.

The following subsections provide broad descriptions of natural hazards that are deemed pertinent to Travis County.



4.1.1 Flood Hazards

When rainfall runoff collects in rivers, creeks, and streams and exceeds the capacity of channels, floodwaters overflow onto adjacent lands. Floods result from rain events, whether short and intense or long and gentle. In recent years, most flooding in Travis County has been associated with storms that originate as hurricanes and tropical storms that subsequently move inland. Flood hazards are categorized as follows:

- **Flash floods** not only occur suddenly, but also involve more forceful flows that can destroy buildings and bridges, uproot trees, and scour out new channels. Most flash flooding is caused by slow-moving thunderstorms, repeated thunderstorms in a local area, or heavy rains from hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urban areas, where much of the ground is covered by impervious surfaces and drainageways are designed for smaller flows. Flood Insurance Rate Maps typically show the 1%-annual-chance (100-year) floodplain for waterways with at least 1 square mile of drainage area. The flood hazard area for waterways with less than one square mile of drainage area typically are not shown.
- **Riverine floods** are a function of precipitation levels and water runoff volumes, and occur when water rises out of the banks of the waterway. Flooding along waterways that drain larger watersheds often can be predicted in advance. It usually takes more than 24 hours for the flood crest (maximum depth of flooding) to pass. In Travis County, most riverine flooding is caused by large rainfall systems and thunderstorm activity associated with seasonal cold fronts. These systems can take as long as a day to pass, giving ample opportunity for large amounts of rain to fall over large areas. The Flood Insurance Rate Maps show the 1%-annual-chance floodplains of riverine systems.
- **Urban flooding** occurs where development has altered hydrology through changes in the ground surface and modification of natural drainageways. Urbanization increases the magnitude and frequency of floods by increasing impervious surfaces, increasing the speed of drainage collection, reducing the carrying capacity of the land, and, occasionally, overwhelming sewer systems. Localized urban flooding is not usually shown on the Flood Insurance Rate Maps in areas with less than one square mile of contributing drainage area.

-
- **Dam failure flooding** occurs when a dam fails and releases impounded water. The sudden release of large volumes of water most often occurs when rainfall is already causing high water levels. If a dam is in poor condition, dam failure can occur under “sunny day” conditions. Areas predicted to flood if a dam fails may have been approximated on a map if an Emergency Action Plan (EAP) has been prepared; typically, only dams classified as “high hazard” have EAPs.

Historically, floods are and continue to be the most frequent, destructive, and costly natural hazard facing the State of Texas. Ninety percent of disaster damage reported is associated with floods.

Travis County was impacted by three significant flood events since 1990. Details of these events can be found in Section 4.2.

4.1.2 Winter Storm Hazards

Winter storms in Texas, although not as numerous or severe as in the northern states, do occur often enough and with sufficient severity to be a threat to people and property. Generally, the winter storm season in Texas runs from late November to mid-March, although severe winter weather has occurred as early as October and as late as May in some areas. On average, central Texas is affected by one to two winter storms each year.

Snow accumulates on occasion. With the County’s generally dry climate, any frozen precipitation falling in Travis County poses a potentially hazardous situation due to ice, wind, and cold temperature. During these cold periods, the weather is often volatile, changing from warm and sunny to freezing in just a few hours. Many homes generally have inadequate cold-weather pipe protection, so are at a greater risk of freezing and bursting water pipes when the outdoor temperature drops to 20°F.

Travis County has sustained damage from ice storms. While infrequent, such storms have affected the entire County, restricting travel, downing trees, interrupting electrical power, and causing water main breakage. The state has an ice response plan that covers all major roads in the County.



4.1.3 High Wind Hazards/Tornadoes

Several meteorological conditions can result in winds severe enough to cause property damage. High winds have been associated with extreme hurricanes traveling inland, tornadoes, and locally strong thunderstorms. Thunderstorms are the by-products of atmospheric instability, which promotes vigorous rising of air parcels. A typical thunderstorm may cover an area three miles wide. The National Weather Service considers a thunderstorm “severe” if it produces tornadoes, hail of 0.75 inches or more in diameter, or winds of 58 miles per hour or more. Structural wind damage may imply the occurrence of a severe thunderstorm.

Tornadoes pose a significant threat to life and safety in Travis County. The National Weather Service defines a tornado as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. Tornadoes can form any time of the year; but the season of greatest activity runs from March to August.

Figure 4-1 illustrates the frequency of tornado strikes in the U.S. per 1,000 square miles. With an average of 153 tornadoes touching down each year, Texas is considered the U.S. “tornado capital.” While Texas tornadoes can occur in any month and at all hours of the day or night, they occur with greatest frequency during the late spring and early summer months during late afternoon and early evening hours. In Travis County, most wind damage has been limited to downed trees, blocked roads, and disabled power lines.

Figure 4-2 provides the “basic wind speed” map referenced in model building codes. This map is used to design buildings to withstand reasonably anticipated winds in order to minimize property damage (reference: ASCE 2002). The County falls within the area where the “design wind” speed is 90 to 95 miles per hour.

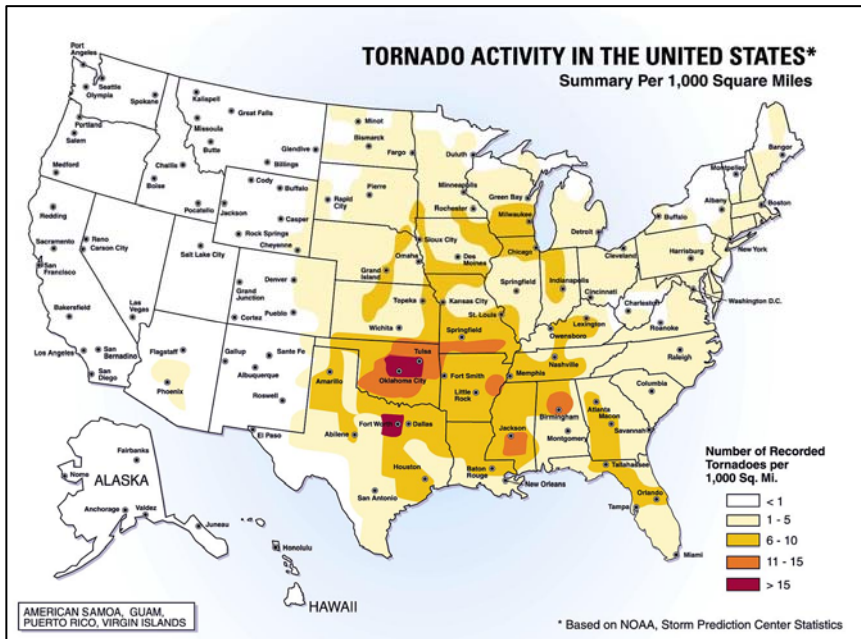


Figure 4-1. Tornado Activity in the U.S.

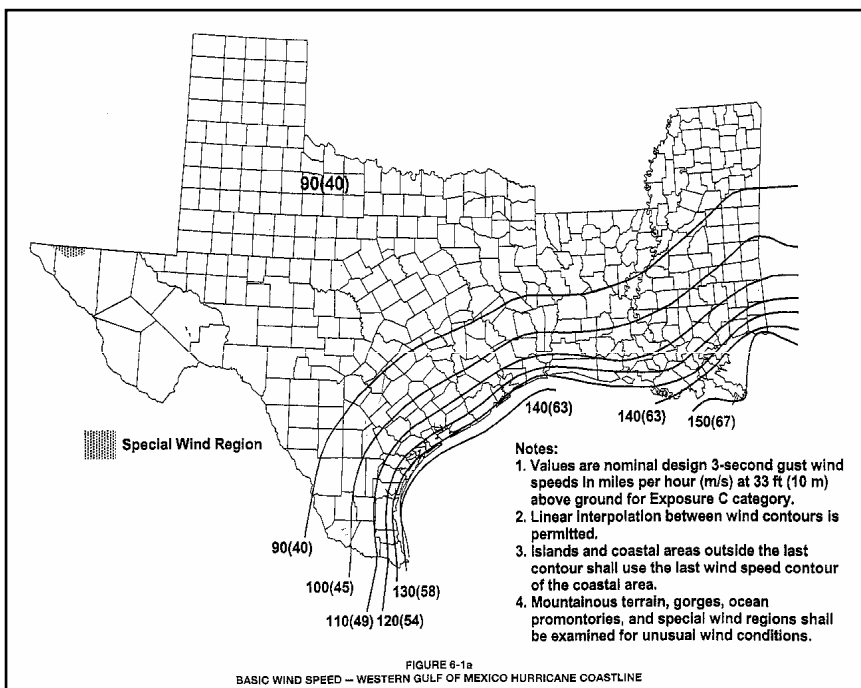


Figure 4-2. Basic Wind Speed: Texas.



4.1.4 Drought

Drought is generally defined as a condition of climatic dryness severe enough to reduce soil moisture and water supplies below the requirements necessary to sustain normal plant, animal, and human life. In Texas, drought is often defined in terms of agricultural and hydrologic drought:

- **Agricultural drought** is considered a dry period of sufficient duration and intensity that crop and animal agriculture are markedly affected.
- **Hydrologic drought** is considered a long-term condition of abnormally dry weather that ultimately leads to the depletion of surface and ground water supplies. During hydrologic drought, a significant reduction in flow of rivers, streams, and springs is notable.

Texas is divided into ten climatic divisions that range from substantially heavy precipitation through semi-arid to arid climates. Most of Texas is prone to periodic droughts of differing degrees of severity. One reason is the state's proximity to the Great American Desert of the southwestern United States. In every decade of this century, Texas has fallen victim to one or more serious droughts. The severe-to-extreme drought that affected every region of the state in the early to mid-1950s was the most serious in recorded U.S. history.

Variations in drought risks to people and property cannot be distinguished by area; the hazard is reasonably predicted to have uniform probability of occurrence (rare) across the entire County. As listed in Table 5-10, all people and assets are considered to have the same degree of exposure. Special facilities include fire stations and schools (nursing homes and day care centers are not identified in the County's GIS).

To estimate potential dollar value of losses to existing buildings, Travis County evaluated the prior loss data from the National Climatic Data Center, (<http://lwf.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>). This data indicated that between 1950 and 2002, there have been no recorded incidences of building damage as a result of drought. Due to the fact that there is no record of any historical building damage as a result of drought in the County, the estimated dollar value of damage to existing or future buildings due to drought is zero. For this reason, drought has been eliminated from further evaluation and risk assessment.

4.1.5 Wildland Fire

The U.S. Department of the Interior has developed the Wildland Fire Assessment System Web site to communicate information to the public via the Internet. Web visitors can view maps showing potential for fire, including satellite-derived "greenness" maps. The system shows each day's high-risk areas in real time. As an example of the data available, Figure 4-3 shows the map for February 6, 2003.

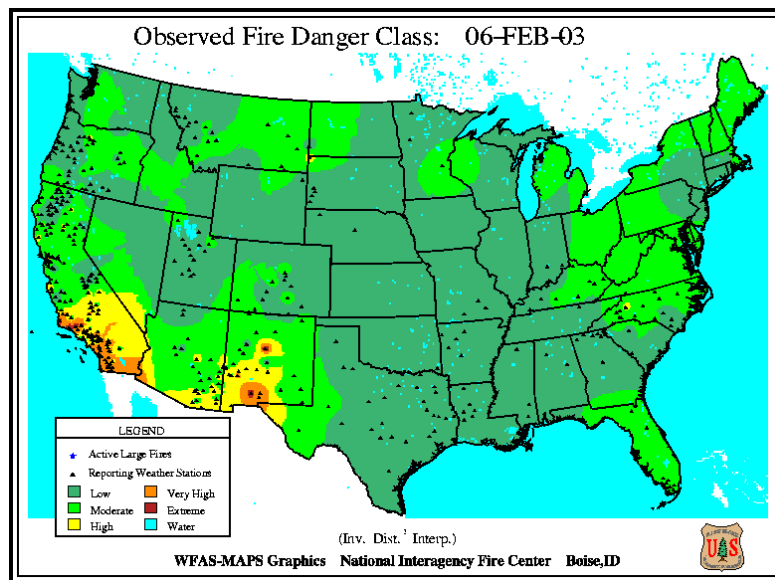


Figure 4-3. Observed Fire Danger Class: 06-FEB-03.

The State of Texas faces major wildfire problems each year. The risk for wildfire is increased and compounded by increasing development within the zone commonly referred to as the “urban-wildland interface.” Within this zone of natural landscape, buildings become additional fuel for fires when fires do occur. Most wildland fires are man-caused and occur in the interface of developed lands and forest and range lands. In particular, the dry conditions, high temperatures, and low humidity that characterize drought periods set the stage for wildfires. In 1998, in what is considered the worst wildfire in state history, wildfires throughout the state burned a total of 422,939 acres and threatened 4,031 structures.

Travis County is at risk for wildfire year-round. Wildfires can spread quickly and may affect large areas of the County in a very short period of



time. Continued growth and development throughout the County have increased the threat from wildfire, especially in the west of the County, where subdivisions abut grasslands and wooded areas in and adjacent to the Balcones Canyonlands Preserve. Narrow roads and long driveways, which increase response time, intensify the risk.

No formal record exists of the number of wildfires occurring in Travis County over the past decade. Records do exist for the brief period from mid-1997 to October 1998, reporting that 693 wildfires burned more than 500 acres during this time period. It is also known that one of the worst wildfires in recent memory, known as the Dessau Road Fire, swept through more than 600 acres southwest of Pflugerville in 1994.

As reported by the City of Austin, the Assistant Fire Chief and Fire Marshall of the Austin Fire Department recently completed a comprehensive, GIS-based, multivariate analysis of the numerous factors that influence wildland fire risk. The study identified the levels of risk, based on an identified risk model, within the west Austin and Travis County urban-wildland interface. For the most part, Travis County's Precinct 3 is considered to have a relatively high risk for wildland fire. The factors assessed by the City included fuel types and sizes, burn behavior of predominate vegetation, fuel densities, topography (slope and aspect), weather, spatial relationships to human values, and temporal elements of frequency.

In terms of probability, although incidents are expected to occur more frequently due to the increase in human activity in forested areas, there is no acceptable mechanism to assign a probability to specific fire occurrences.

4.1.6 Hazardous Materials

Hazardous materials are chemical substances that, if released or misused, can pose a threat to health or the environment. Hazardous materials incidents are most often caused by transportation accidents or industrial chemical accidents. A natural disaster such as flooding might also result in spills.

Hazardous materials come in many forms, such as explosives, flammable and combustible substances, poisons, and radioactive materials. Since their chemical properties vary significantly, an incident could be obvious (e.g., plume in the sky, spill on the ground, bad smell) or not readily apparent (e.g., beneath the surface of the ground, no odor or color).

Hazardous material incidents are one of the most common technological threats to public health and the environment. The Texas Commission on Environmental Quality (TCEQ) is the state's lead agency in the response to most hazardous substance spills, certain inland oil spills, and spills of other substances that cause pollution or damage to the environment. TCEQ maintains a database of all hazardous substance incidents reported by the state. TCEQ statewide data for the years 1993 to 1997 reveal that an average of 1,282 hazardous material incidents were reported each year.

An analysis of TCEQ data indicates that the number of incidents reported is declining, probably because manufacturers, users, and transporters of hazardous materials are becoming more aware of the financial and political costs of hazardous materials incidents. Roughly 65% of all incidents occur at fixed facilities, and some 25% involve highway, rail, water, or pipeline transportation. The remaining 10% involve other situations or undetermined causes.

The Travis County Office of Emergency Management (OEM) maintains documentation on incidents involving hazardous materials (transportation and fixed facility) and maintains a database of reports submitted by handlers and manufacturers in compliance with federal requirements (Tier Two reports required under SARA Title Three).

Most reported hazardous materials fixed sites (handlers and storage) in the area are located in the City of Austin. In the County, the main hazardous materials concerns are related to transport incidences and chlorine used at the 95 water treatment companies throughout the County – some of which may be located in the floodplain. There have been no Emergency Operations Center (EOC) activations due to hazardous materials incidences and there have been no reported hazardous materials incidences related to flooding.

4.1.7 Seismic Hazards (Earthquakes)

An earthquake is a sudden motion or trembling caused by an abrupt release of accumulated strain on the tectonic plates that comprise the Earth's crust. Ground motion may be vertical or horizontal shaking. Figure 4-4 presents the general “earthquake risk” map prepared by the U.S. Geological Survey. It shows relative risk to compare seismic risks across the country. Most of Texas, including Travis County, is designated the lowest hazard rating.

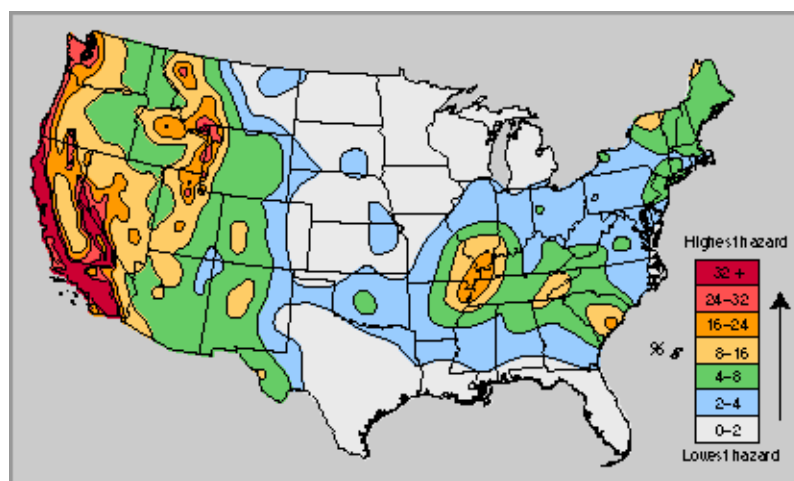


Figure 4-4. U.S. Seismic Hazards.

Due to the extremely low probability of an earthquake within Travis County and the fact that there is no record of any historical building damage as a result of seismic activity in the County, the estimated dollar value damage to existing or future buildings due to earthquakes is zero. For these reasons, seismic hazards have been eliminated from further evaluation and risk assessment.

4.1.8 Landslides

The term landslide is used to describe the downward and outward movement of soils and rocks moving down a slope under the force of gravity. Landslides include mudflows, mudslides, debris flows, rock falls, rock slides, debris avalanches, debris slides, and earth flows. Most landslides are associated with heavy and prolonged rains, which saturate soils.

In 1997, the U.S. Geological Survey published a national map to illustrate landslide risk areas (Figure 4-5). The map combines past incidents with a measure of “susceptibility”, defined as the “probable degree of response of rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation.” Travis County is shown on the map as having had less than 1.5% of its land area affected by movement of soils on slopes (no planning period is identified). The western part of the County, known as the Hill Country, is shown as having moderate susceptibility.

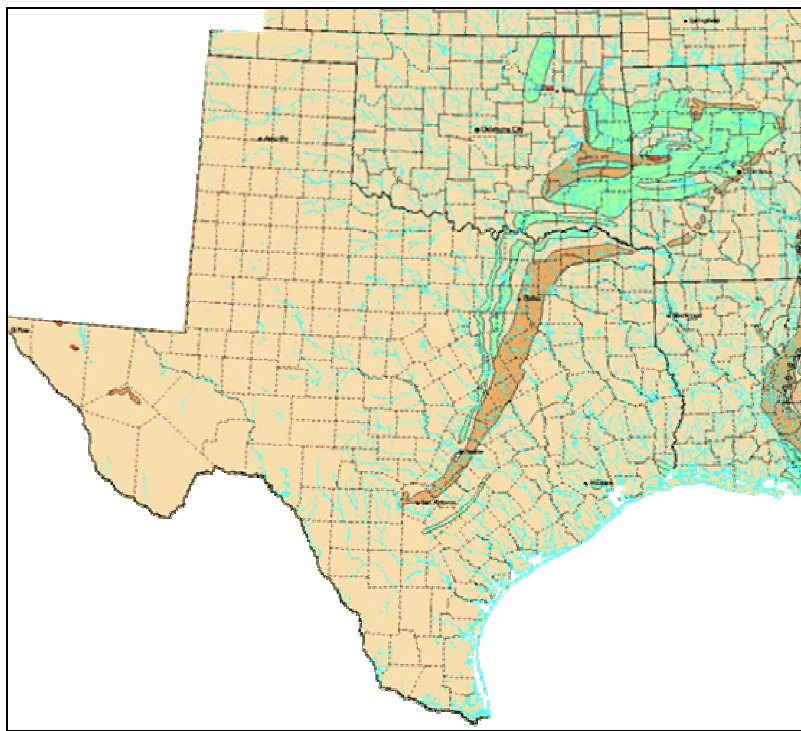


Figure 4-5. Landslide Risk: Texas.

Due to the extremely low probability of landslides within Travis County, the limited number of buildings near the susceptible areas and the fact that there is no record of any historical building damage as a result of landslides in the County, the estimated dollar value damage to existing or future buildings due to landslides is zero. For these reasons, landslides have been eliminated from further evaluation and risk assessment.



4.2 Overview of Travis County's Natural Hazards History

Numerous federal agencies maintain a variety of records regarding losses associated with natural hazards. Unfortunately, no single source is considered to offer a definitive accounting of all losses. The Federal Emergency Management Agency maintains records on federal expenditures associated with declared major disasters. The U.S. Army Corps of Engineers and the Natural Resources Conservation Service collect data on losses during the course of some of their ongoing projects and studies. Additionally, the National Climatic Data Center of the National Oceanographic & Atmospheric Administration (NOAA) collects and maintains certain data in summary format, indicating injuries, deaths, and costs. The basis of the cost estimates, however, is not identified (Reference: NOAA, online).

Some Historic Events: Greater Austin Area

- *1869: rain lasted 64 hours, damage was catastrophic*
- *1900: 7-inch rain storm created a wall of water claiming 23 lives*
- *1913: 10-day storm with 14 inches of rain*
- *1974: flooding claimed 13 lives*
- *1981: 10-inch rain resulted in \$35.5 million damage and killed 13 people*

In the absence of definitive data on some of the natural hazards that may occur in Travis County, illustrative examples are useful. Table 4-1 provides brief descriptions of particularly significant natural hazard events occurring in the County's recent history.

Data on Presidential Disaster Declarations characterize some natural disasters that have affected the area. In 1965, the federal government began to maintain records of events determined to be significant enough to warrant declaration of a major disaster by the President of the United States. As of 2003, four such disasters had been declared in Travis County and are described below in Table 4-2. No emergencies or disaster

have occurred during period of development of this Plan; thus the Plan represents an up-to-date overview of the impacts of disasters that predate that period.

Table 4-1
Some Significant Natural Hazard Events
in Travis County.

Date	Nature of Event
July 1869	Flooding. Probably the biggest flood in Texas history - Produced by heavy rain, which extended into Northwest Texas - Tremendous flooding down the Colorado River from the headwaters to the mouth. The rise was estimated at forty six feet. The mass of waters rushed down from the narrow and confined channel between the mountains above, to the wider one below, with such fearful velocity that the middle of the stream was higher than the sides.
September 6, 1921	Flooding. A tropical storm formed the morning of Sep 6, 1921 - made hurricane intensity that afternoon - made landfall near Vera Cruz the early morning of Sep 7 - veered right and fell below depression intensity just as it crossed the Rio Grande. The storm total was 39.7" in 36 hrs - With 215 drownings statewide this was the deadliest flood in Texas history.
June 9- 15, 1935	Flooding. During peak of normal flood season – storm stalled west of Central Texas for 6 days. Low level jet from Gulf and mid and upper level flow off Eastern Pacific over Central Texas caused widespread, long lived, disastrous flooding over the Texas Hill Country.
September 11, 1952	Flooding. In the middle of the six year, worst in Texas history drought (1950 - spring of 1957), a disastrous flood occurred. This flood followed the El Nino winter of 1951/1952. The highway 281 bridge was washed away and destroyed at Johnson City on the Pedernales River. Major flooding also passed down from the mid Guadalupe River.
April 5, 1996	Lightning. Lightning struck a 51-year-old visitor from Scotland as he was playing golf in the southeast part of Austin. He remained in critical condition for nearly 2 weeks after the strike, and died on April 13th.
May 27, 1997	Tornado – F4. The Pedernales Valley tornado began on the shore of Lake Travis, destroying trees and a floating marina, where nearly all of the watercraft were destroyed. Numerous trees were twisted and uprooted, a Southwestern Bell building housing telephone switching equipment destroyed, and 50 houses/mobile homes completely destroyed. The only death associated with this tornado occurred when a man's mobile home was demolished and his vehicle tossed several hundred feet. Survey team members were unable to determine whether he was in the mobile home or had left it to drive away.
1994	Wildfires/Brush Fire. One of the worst brush fires in Travis County history, the "Dessau Road" fire burned over 600 acres, destroyed two abandoned buildings, and damaged a fire truck. Eleven fire departments were involved in containing and extinguishing the blaze.
July 23, 2000	Excessive Heat. A 2-year-old boy died of heat stroke. He had a temperature of 108 degrees when he reached the hospital. He was left on the floor of a sunroom and his mother had fallen asleep. A 72-year-old woman also died of heat stroke. Although air conditioning was available in her home, she had not turned it on.



Table 4-1
Some Significant Natural Hazard Events
in Travis County.

Date	Nature of Event
July 31, 2000	Drought. In spite of the rainfall east of I-35 in June, the severe drought that began early in 2000 across the southwest parts of South Central Texas spread again in July to cover all but the southeast counties. Little to no rain was recorded across these counties in July, and nearly all river levels were reported to be low. Aquifer levels and lake levels were approaching all-time low readings, and strong conservation measures were enacted across much of the area. Numerous small creeks and streams ceased flowing. Agricultural activities were essentially brought to a halt.
November 15, 2001	Flood, and Flash Floods. Heavy rains caused flash flooding and power outages for several hours to almost 40,000 homes. Most low-water crossings flooded and dozens of rescues were required. More than 80 people were evacuated from around the Onion Creek area south of Austin. Onion Creek went above flood stage, in some of the worst flooding since October of 1998, cresting at 36.5' (flood stage is 17.0'). There were two deaths, 50 injuries, and \$500,000 in property damage as a result of these storms.
June 26, 2002	Hail, Thunderstorms, and Wind. High winds and large hail struck Lake Travis, causing damage to windows and roofs of homes and boats in the area. The worst damage occurred when the high winds shoved a boat into the wall at Mansfield Dam with sufficient force to sink the boat. Severe thunderstorm winds knocked down trees across the city of Austin. Many of these trees fell on utility lines, knocking out power to one thousand residents for several hours.

Table 4-2
Natural Hazard Events Declared as Major Disasters.

Date	Nature of Event
12/25/1991	Flood. Heavy rains produced the historical maximum flood on Lake Travis. Residents and businesses affected in Travis County were primarily those situated within the flood pool of Lake Travis, along the Colorado River, and along the creeks in the southeast part of the County that feed into the Colorado river. Federal declaration was for Individual Assistance only. (DR 930)
06/22/1997	Lake Travis Flood. Heavy rains inundated more than 100 homes in the flood pool of Lake Travis. Additionally, homes in southeast Travis County along several creeks were affected by this event. Residential damage was estimated to be over \$1M. Federal declaration was for Individual Assistance only (DR 1179)
10/17/1998 – 10/18/1998	Flood. Hurricane Georges caused extensive flooding throughout the County. The storm dumped over 8 inches of rain on Travis within a 24-hour period. Roads, culverts, and other public facilities sustained over \$200,000 in damages. Federal declaration was for Individual Assistance only (DR 1257)

Table 4-2
Natural Hazard Events Declared as Major Disasters.

Date	Nature of Event
07/01/2002 – 07/05/2002	Flood and Flash Floods. Heavy rains fell over a four-day period causing damage to homes, roads, and bridges. Barton Creek crested at 17.9 feet, where flood stage is 11.0 feet. Onion Creek crested at 23.8 feet, where flood stage is 17.0 feet. There was one death and significant property damage as a result of these storms. Federal emergency declaration – IA only (DR 1425)

4.3 Losses Due to Major Disasters

No definitive record exists of all losses – public and private – due to disasters for Travis County. For the United States as a whole, estimates of the total public and private costs of natural hazards range from \$2 billion to over \$6 billion per year. Most of those costs can only be estimated. In most declared major disasters, the federal government reimburses 75% of the costs of cleanup and recovery, with the remaining 25% covered by the state and affected local jurisdictions.

The Federal Emergency Management Agency’s estimate of its expenditures in the State of Texas for flood disasters alone for the period from 1991 through 2001 exceeds \$6.8 billion. This period includes Tropical Storm Allison, which inflicted damages in excess of \$1 billion. These costs, which do not include costs incurred by other federal agencies or by state and local agencies, include those associated with:

- Public assistance for debris removal, emergency works, roads and bridges, flood control facilities, public buildings and equipment, public utilities, and parks and recreational facilities.
- Assistance paid out for individual and family grants, emergency food and shelter, and other assistance to individuals.
- Funds set aside to support hazard mitigation grants.

As of 2003, four major disaster declarations included Travis County. Two declarations were for Individual Assistance only (DR 1179 and DR 1425). The 1991 event (DR 1257) resulted in some public assistance funding for debris removal and overtime.

The Christmas Floods of 1991 (DR 930) prompted approval of nearly 80 separate work items under FEMA’s public assistance program. As shown



in Table 4-3, the items were approved for removal of debris and sediments on public property, repair of minor erosion, and loss of road surface, and clean up of flooded restrooms at public parks. Two specific sites received funding for “mitigation” measures:

- Addition of riprap on slopes at Tom Sassman Road; and
- Raise wall on box culvert to protect slope at Greg Lane.

Table 4-3
DR 930: Public Assistance Received from FEMA.

Cost Item	Number of Sites	Amount of Assistance
Buildings (restrooms cleanup)	12	\$ 84,828
Site work (parks, recreational fields, paths, fences)	6	\$ 65,917
Road embankment, erosion, drainage repairs, road surface	48	\$ 68,235
General debris and sediment removal	11	\$ 61,437
Security, search and rescue, traffic control	N/A	\$ 31,037

Travis County has received federal hazard mitigation funds to support mitigation initiatives:

- \$6,000 in 1997 for an encoder/decoder, part of the emergency alerting system that enables OEM to send and receive early warning messages;
- \$2.8 million for buyouts of homes damaged in 1998 (see Section 6.4.4); and
- \$37,500 to support development of the flood mitigation plan; the County is providing additional funds to expand this effort to satisfy the planning requirements of FEMA’s HMGP and PDM grant programs.

5.1 Overview of Risks

Damage and losses (including physical damage, indirect and economic losses, and injuries and deaths) that are associated with hazards result when an event affects areas where people and improved property are located. After hazards are identified then estimates of how exposed people and property are (how “at-risk”) can be prepared, especially if the hazards can be characterized by areas on a map.

When the full range of possible natural and man-made hazards is reviewed, it becomes apparent that some events occur frequently and some are extremely rare. Some hazards impact large numbers of people to a limited degree, while others may cause very localized but very significant damage. As described in Section 4.1.1, floods and flash floods have historically caused the most property damage and loss of life in Travis County.

An overview of the hazard history data provided by the Travis County Office of Emergency Management reveals some salient statistics:

- There have been 50 Austin/Travis County Emergency Operations Center activations since 1991 (list of activations triggered by natural hazards included in Appendix E-1).
- Four activations were associated with Presidential Disaster Declarations:
 - December 1991 – Christmas Floods
 - June 1997 – Lake Travis Flooding
 - October 1998 – Central Texas Flooding
 - July 2002 – Severe Weather – Lake Travis Flooding
- Between 1986–2001, the Austin area (including counties) experienced 187 severe thunderstorms, 68 tornadoes, and 479 flash floods.
- Between 1973–2000, the Austin area experienced a total of 88 weather-related deaths: Flood/flash flood – 44; Tornado – 30; Lightning – 6; Winter storm – 4; Extreme heat – 3; Severe thunderstorm – 1.



5.2 Public Awareness of Hazards & Risk

The public becomes aware of local hazards in a number of ways. For example, public awareness of flood hazards is enhanced during the following activities:

- **Buying property in a floodplain** triggers the federal requirement to obtain flood insurance when obtaining a federally insured and regulated mortgage. Federally insured and regulated mortgage lenders are required to make homebuyers purchase flood insurance if the building is located in a mapped flood hazard area. Buyers are supposed to be notified well in advance of closing.
- **Applying for permits** may lead to a determination that the property or construction site is within a mapped floodplain and therefore subject to the drainage and floodplain management requirements.
- **When flooding occurs** the news media frequently carries stories about travel hampered by flooded roads and homes damaged by floodwaters. Research has shown that many flood victims themselves tend to discount the likelihood that flooding will occur again. This tendency is attributed to a general lack of understanding of probability (see Comparing Risks, below). All too often, people interpret the phrase “100-year storm” to mean that it only occurs once every 100 years, rather than that such an event has a 1-in-100 chance of happening each year. FEMA reports that, based on insurance statistics, a building in the floodplain is five times more likely to be damaged by flood than to sustain major damage by fire.
- **Flood warnings** reach the public as regional warnings from the National Weather Service or local warnings in areas covered by Austin’s Flood Early Warning System.

Comparing Risks

*What’s the chance that in the next year, a person whose house is **in** the floodplain will:*

- *Be involved car accident? 3 chances in 100*
- *Be in 100-year flood? 1 chance in 100*
- *Have a car stolen? 1 chance in 300*
- *Be a victim of robbery? 1 chance in 1,000*
- *Have a residential fire? 4 chances in 10,000*

www.floodsafety.com

a project of the Texas Environmental Center

5.2.1 Flood Warnings

For Lake Travis and some other waterways in the County, flood warnings are closely coordinated with the City of Austin and LCRA. Emergency management staff and other County staff in support roles are notified by pager. The EOC monitors situations, informs the public of road closures, and serves as a clearinghouse for requests for resources. The paging system is used to distribute notices to the media, which issues most warnings.

Austin's Flood Early Warning System (FEWS) is based on an extensive network of 87 precipitation and stream gauges arrayed throughout several of the City's watersheds in which roads and neighborhoods are known to flood. The instrumented watersheds are on the order of 12 square miles and are "flashy," with flood conditions occurring within one to five hours after rainfall. Based on experience and mapping, the City has designated certain areas for evacuation if monitored conditions suggest flooding is imminent.

Onion Creek, where the County's most significant recent damage has occurred, is problematic because much of the 343 square mile watershed is in Hays and Blanco Counties. Because just three of the City's FEWS precipitation gauges are in the mid-reach of Onion Creek, only general warnings can be issued for this watershed.

Lake Travis flooding is influenced by the operation of LCRA dams. For downstream areas, LCRA typically provides about 6 hours' warning prior to opening gates on Lake Travis/Mansfield Dam.

5.2.2 Weather-Related Deaths

The National Weather Service and the Travis County Office of Emergency Management maintain data on weather-related deaths. Summary statistics based on those data are provided in Table 5-1. Because the reporting periods are different, percentages, not actual numbers, are provided. Deaths due to floods and flash floods accounted for 35% of all weather-related deaths statewide, and 44% in the seven-county Greater Austin area. Figures maintained by the National Climatic Data Center and the Centers for Disease Control indicate that Texas leads the country with more flood-related deaths than any other state.



Table 5-1
Weather-Related Deaths

(as percent of all weather-related deaths).

Hazard	Statewide (1989–2000)	Greater Austin (1973–2000)
Flood/Flash Flood	35%	58%
Tornado	10%	29%
Lightning	8%	5%
Winter Storm	6%	4%
Extreme Heat	34%	3%
Severe Thunder Storm	4%	1%
Hurricane/Tropical Storm	3%	0%

5.3 Flood Risks – Overview

The Flood Insurance Rate Maps (FIRMs) prepared by FEMA offer the best overview of flood risks. FIRMs are used to regulate new development and to control the substantial improvement and repair of substantially damaged buildings. Map 5-1^{*} shows the extent of mapped Special Flood Hazard Areas (i.e., the 100-year floodplain) in Travis County. At 106.9 square miles, the SFHA makes up 10.8% of the total land area in Travis County (total land area is 992 square miles, and total County area, including water bodies and incorporated cities, is 1,024.8 square miles).

The revised Flood Insurance Study (FIS), dated April 15, 2002, covers Travis County and its incorporated municipalities. It compiles all previous flood information into the countywide format and includes data collected on numerous waterways. Findings from the FIS are summarized below:

- **Principal Flood Problems.** Stream channels along the north and west of the Balcones Escarpment tend to be narrow, with rock beds and banks of high relief. Because soils in these areas are relatively nonporous, there is considerable runoff and, hence, a possibility of

^{*} Maps included in this Plan are available for viewing at Transportation & Natural Resources. The scale required for hardcopy maps does not allow sufficient detail to show all of the elements described in this section.

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Insert Map 5-1
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Flood Hazards in Travis County

Page 5-5



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flash flooding. In the south and eastern portions, as the soils change into clay and sand, the stream channels widen, increasing the area of the floodplain. Data from U.S. Geological Survey, U.S. Weather Bureau, newspaper data, the Texas Department of Highways and Public Transportation, the City of Austin, and Travis County reveal that large and damaging floods occurred in the area (in 1833, 1843, 1852, July 1869, 1870, June 1899, April 1900, April, 1908, December 1913, April and September 1936, July 1938, June 1940, April 1941, September 1952, June 1957, October 1959, 1960, 1961, May 1965, May 1970, May 1981, and June 1981). [Note: More recent events were not included because this background text of the FIS was not updated.] Considerable floodplain development has increased the severity of flood hazards in the County. The existence of numerous low water crossings, dams, small bridges, and culverts has also aggravated flood hazards.

- **Flood Protection Measures.** Major flood protection is provided by a system of dams and reservoirs developed along the Colorado River that stretches from Lake Buchanan in Llano and Burnet Counties to Lake Austin, the site of the Tom Miller Dam (formerly Lake Austin Dam). Six dams comprise the system, stretching like massive steps down the length of the lower Colorado River. The six dams are maintained by the Lower Colorado River Authority. Below this chain lies the smaller channel lake, Town Lake, which is impounded by Longhorn Dam, built and maintained by the City of Austin. Travis County has adopted ordinances for subdivision design and drainage, and floodplain management regulations. The City of Austin has installed a Flood Early Warning System.

FEMA's maps for Travis County show four types of flood zones:

- **AE Zones** along rivers and streams for which detailed engineering methods were used to determine Base Flood Elevations. Table 5-2 identifies the waterways in Travis County that were mapped using these methods. AE Zones (or A1-30 Zones) are shaded in gray. Most of the waterways mapped using detailed methods have designated floodways.
- **A Zones** or "approximate" flood zones, where detailed information on the Base Flood Elevations (elevation to which flood waters associated with the 1-percent-annual chance flood are predicted to rise) has not been developed. A Zones are shaded in gray.
- **B Zones and Shaded X Zones**, which are areas of "moderate" flood hazard, typically associated with the 500-year flood (or 0.2% annual chance).



- **C Zones and Unshaded X Zones** are areas of “minimal” flood hazard, typically considered to be “out of the floodplain.” Although local drainage problems and ponding may still occur, these minor flood problems typically are not shown on the FIRM.

Table 5-2
Streams Studied by Detailed Methods.

Streams on the FIRM		
Apache Shores Creek	Gilleland Creek (& Tributaries 1, 2, & 3)	Pedernales River
Barton Creek	Givens Park Tributaries 1 & 2	Possum Trot Branch
Bear Creek	Hancock Branch	Rinard Creek
Bee Creek	Harris Branch (& Tributaries 3, 4, & 5)	Shoal Creek
Big Sandy Creek (& Tributaries 1, 2, & 3)	Hemphill Branch	Slaughter Creek (& Tributary 1)
Blunn Creek	Hurst Creek (& Tributary 1)	South Fork Dry Creek 3
Boggy Creek North (& Tributary 1)	Johnson Creek	St. Edwards Branch
Boggy Creek South (& Tributary 1)	Lime Creek (& Tributaries 1, 2)	Stream Bear-1
East Bouldin Creek	Little Barton Creek	Tannehill Branch (West Trib 3)
Bull Creek (& Tributaries 1, 2, 4, 5, & 6)	Little Barton Tributary	Waller Creek
Carson Creek	Little Bear Creek	Walnut Creek (& Tributaries 1 – 10, 7A, 9 Diversion)
Cherry Creek	Little Bee Creek	Wells Branch
Colorado River	Little Walnut Creek (& Tributaries 1, 2, 3)	West Bouldin Creek (& North Fork)
Cottonmouth Creek	Long Branch	West Bull Creek (& Tributary 1)
Cypress Creek (& Tributaries 1, & 2)	Long Hog Hollow	Williamson Creek (& Tributaries 1- 6)
Decker Creek (& Tributary 1)	Long Hollow Creek	Yaupon Creek
Kincheon Branch (of Williams Creek)	Marble Creek	
Dry Creek 1, 2, & 3	New Country Club Creek (& Tributaries 1, 2, 3, 4)	
Foster Branch	Old Country Club Creek (& Tributaries 1, 1A)	
	Onion Creek	

5.4 Flood Risks – Buildings

Although Travis County has had maps showing flood-prone areas for many years, only recently has the County gained the ability to use those maps to develop more specific information about buildings. The tool that makes this possible is the Geographic Information System (GIS). GIS is a computer software application that relates physical features on the ground to be used in mapping applications and analyses. In Travis County, the GIS functions are located in Transportation & Natural Resources.

The Travis County GIS maintains and accesses numerous digital map products and electronic data files. Among the data and maps are FEMA's Q3 Digital Flood Data map (derived from the Flood Insurance Rate Maps), and maps showing county/city boundaries, waterways and watershed boundaries, and "footprints" of buildings and other facilities.

A comparison of the flood map with the locations of buildings yields an estimate that 6,725 buildings are located in the 100-year floodplains of the unincorporated areas of the County. A listing, by watershed, is included in Appendix E-2, which also shows that an additional 19,175 flood-prone buildings are in the incorporated cities.

Approximately 9% of all buildings in the County are prone to some degree of flooding. The database of buildings does not allow determination by use (residential versus non-residential), but it does allow discrimination by size (smaller than or larger than 4,000 sq ft). The fact that most buildings in the County are smaller than 4,000 sq ft suggests that the majority of buildings in the floodplain are single-family homes.

Data tabulated by precinct, including estimates of the total value of buildings and the value of at-risk to damage by flood, are listed in Table 5-3. Data from the Travis County Assessment District and the U.S. Census were used to develop "average" values for residential buildings. For Precincts 1, 2, and 3, the value used is \$231,000 (likely lower than actual average value). For Precinct 4, the value used is \$134,700 (likely higher than the known value of most flood-prone homes).

Using the Travis County GIS, TNR developed Map 5-2 to characterize flood risks to buildings by watershed (County only). Out of the 64 watersheds shown to be wholly or partly in the County, 45 have one or more buildings that appear to be in the mapped floodplain. Appendix E-2 contains a tabulation of all watersheds shown on the map. The 14 watersheds that have more than 100 buildings "in" the floodplain are listed in Table 5-4.



Table 5-3
Flood-Prone Buildings and Estimated Values, by Precinct.

	Precinct 1		Precinct 2	
All buildings (smaller than 4000 sf)	12,410	\$2,864M	10,020	\$2,315M
All buildings (larger than 4000 sf)	590	\$699M*	480	\$568M*
In the Floodplain (as % of total bldgs)	730 (5.6%)	\$169M	215 (2.0%)	\$29.7M
	Precinct 3		Precinct 4	
All buildings (smaller than 4000 sf)	33,900	\$7,831M	10,690	\$1,440M
All buildings (larger than 4000 sf)	3,100	\$3.672M*	610	\$722M*
In the Floodplain (as % of total bldgs)	3,585 (9.7%)	\$828M	2,195 (19.4%)	\$296M

* TCAD provided the complete tax roles for all of Travis County. From these data the following averages for non-residential buildings were derived – average SQFT of non-residential buildings = 20,109 sf; average value of non-residential buildings = \$1.18M. The data provided were not available by precinct, therefore one average value was used for all precincts. It was not possible to determine if all commercial structures were located solely with unincorporated Travis County.

Table 5-4
Watersheds and Flood-Prone Buildings.

More than 100 Buildings “In” the Floodplain	
Barton Creek (207 buildings)	Maha Creek (161 buildings)
Big Sandy Creek (148 buildings)	Onion Creek (1,113 buildings)*
Decker Creek (138 buildings)	Pedernales River (327 buildings)
Gilleland Creek (166 buildings)	Slaughter Creek (263 buildings)
Harris Branch Creek (128 buildings)	South Fork Creek (125 buildings)
Lake Austin (146 buildings)	Town Lake (713 buildings)
Lake Travis (2,242 buildings)	Walnut Creek (148 buildings)
	*See Section 6.4.4

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Travis County Watersheds (flood-prone buildings, by
watershed)

Page 5-11



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NFIP Policies In-Force. Data provided by FEMA indicate that as of June 30, 2002, federal flood insurance policies were in-force on 1,248 buildings in Travis County (nearly 18% of all buildings in the floodplain). These policies are administered by the National Flood Insurance Program (NFIP). This represents a dollar value of property and contents coverage in excess of \$194 million. The locations of buildings with flood insurance are shown on Map 5-3. It is notable that 1,171 points are shown (the remaining 77 locations were unable to “geocode” with sufficient accuracy to allow them to be mapped). Table 5-5 shows the distribution of NFIP policies held and claims paid by precinct.

Table 5-5
NFIP Policies & Claims, by Precinct.

	Precinct 1	Precinct 2	Precinct 3	Precinct 4
NFIP policies*	106	114	675	276
NFIP claims*	26	16	162	59
NFIP repetitive loss properties*	5	2	33	7

* Includes only those that geocoded and show on the map.

For the most part, two factors prompt people to purchase flood insurance – when mortgage lenders require it and when actual flood damage makes it clear to homeowners that a building is, indeed, located in a flood-prone area. Thus, the number and distribution of flood insurance policies is one way to characterize potential risk throughout the County.

NFIP Claims Paid. Between 1978 and June 30, 2002, flood insurance claims were paid on 342 buildings in Travis County. It appears that all of these claims were for residential properties. The locations of most of these properties are shown on Map 5-3 (79 locations were unable to “geocode” with sufficient accuracy to be mapped). Table 5-5 shows the distribution of claims by precinct.

NFIP Repetitive Loss Properties. Map 5-3 also shows the locations of “repetitive loss properties” in Travis County, and Table 5-5 shows their distribution by precinct. In recent years, FEMA has focused considerable attention on this subset of insured buildings. These properties have



received two or more claim payments of at least \$1,000 over a ten-year period. For Travis County, FEMA’s database identifies 63 properties as “repetitive loss properties” (as before, only 47 can be geocoded and shown on the map). Collectively, they have received claim payments nearing \$2 million (includes payments for building damage and contents damage). Because the data provided by FEMA do not detail the actual number and amount of past claims, no conclusions can be drawn regarding whether specific mitigation measures would be effective. For example, a property that has received a number of claim payments not much higher than \$1,000 would be considered an unlikely candidate for mitigation using public funds. It may, however, be an excellent candidate for damage-reduction actions taken by the owner.

As shown on Map 5-3, there are a number of clusters of NFIP policies and claims, and many areas without data points (see also the Table of Flood-Prone Buildings, by Watershed, in Appendix E-2). Gray-shaded areas are within the City of Austin or the other incorporated municipalities. A review of this map yields the following observations:

- Lake Travis, and in particular the Hudson Bend peninsula just west of Mansfield Dam and north of Rout 620, and Graveyard Point, exhibit a number of dense clusters of both policies and claims. While in part this may be due to the generally higher income of residents in the area who are more likely to purchase flood insurance coverage, it also reinforces the fact that the Lake is a relatively high-risk area.
- A cluster of policies and a few claims are found in the lower reach of the Colorado River, just above Lake Austin.
- The lower portion of Slaughter Creek, which flows through both the County and the City of Austin, has a relatively dense cluster of policies but only one claim.
- Two small clusters are found in the very upper reaches of Walnut Creek and Gilleland Creek, above the incorporated areas. It notable that the lower portion of Gilleland Creek appears to have fewer at-risk buildings.
- One of two clusters in the Onion Creek watershed within the unincorporated area of the County is near the southwestern border and just east of US I-35. Policies and claims are found in the Onion Creek Subdivision.
- Another Onion Creek cluster, which includes some repetitive losses, is shown in the Timber Creek subdivision, just east of the Austin Bergstrom International Airport (see Section 6.4.4 regarding the County’s buyout project in this area).

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Policies, Claims, Repetitive Losses

Page 5-15



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Travis County continues to work with both the Hazard Mitigation Grant Program (post-disaster) and the Flood Mitigation Assistance Program (pre-disaster) to mitigate flood-damaged properties, including many on the NFIP “repetitive loss property” list.

5.5 Flood Risks – Public Buildings

Travis County government owns many buildings and parcels of land in various locations throughout the County. OEM reports that critical County facilities are located in the City of Austin, including hospitals and the Emergency Operations Center. Using the GIS, it was determined that 12 County facilities are located in the 100-year floodplain; these are shown on Map 5-4 and listed in Appendix E-3. The most significant facilities are listed below and maximum exposure damage potential (highly unlikely “total” loss) is estimated in Table 5-6:

- **Bob Wentz Park**, located on Lake Travis: entrance booth and park pavilion (1,256 sq ft).
- **Hamilton Pool Park**, located on the Pedernales River: maintenance shed (350 sq ft).
- **Moya Park**, located on Onion Creek: concession stand (1,088 sq ft); maintenance shed (1,840 sq ft); three restrooms; and five shelters. The concession stand will not be put back in service and the maintenance shed will be reduced in size.
- **Webberville Park**, located on the Colorado River: restroom and three shelters.
- **Vehicle Services Building**, located at 1000 North Lamar in the floodplain of Shoal Creek, is a 2,100 square foot facility used to service County vehicles. No structural damage in past floods.
- **Southeast Service Facility**, located at 5412 Lockhart Highway, partially in the floodplain of Onion Creek: covered garage sheds, maintenance sheds, small office building; anchored fuel storage tank.

The Christmas Flood of 1991 affected a number of restroom facilities at County parks. While cleanup was required, no permanent physical damage was sustained.



Travis County does not own wastewater treatment facilities and sewage collection systems. Private facilities that appear to be in or near the floodplain are shown on Map 5-4.

Table 5-6
Maximum Exposure Estimates for Flood-Prone County
Facilities.*

Facility	Size	Replace- ment Value**	Contents Value**	Displace- ment Cost***	Total
Bob Wentz Park (Entrance Booth)	80 sq ft	\$2,000	\$500	N/A	\$2,500
Hamilton Pool Park (Maintenance Shed)	350 sq ft	\$3,500	Variable	N/A	\$3,500+
Moya Park (Concession Stand)	1088 sq ft	-0-	-0-	-0-	Out of service
Moya Park (Maintenance Shed)	1840 sq ft	\$18,000	Variable	N/A	\$18,000+
Vehicle Services Building	2100 sq ft	\$11,000	Variable	N/A	\$11,000+
Southeast Service Center (covered parking)	Open pole	\$5,000	Vehicles, equipment	N/A	\$5,000

* excludes open pavilions, shelters, and restrooms

** estimates; contents values vary with season and usage

*** total damage highly unlikely; would not require relocation of use or rental/temporary replacement during cleanup/repair

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At-Risk Public Facilities and HazMat Sites

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-
- Other public entities, besides the County, own buildings and facilities in Travis County. Map 5-4 shows where these buildings appear to be located in the mapped floodplain:
 - Thirteen Emergency Service Districts (ESDs) serve the County, providing fire and emergency medical services. One facility, Fire Station #1108, located at 1600 Citation Drive, appears to be in the floodplain.
 - The Austin Independent School District owns the County's public schools. Two locations appear to have some degree of flood risk (Reilly Elementary and Ortega Elementary). With sites as large as 10 acres, flooding may only affect land and not buildings.
 - Ninety-five private water treatment companies operate facilities throughout the County. Their locations are shown on Map 5-4, along with other sites where hazardous materials are used or stored. Records on hazardous materials are managed by the Local Emergency Preparedness Committee (LEPC), which operates under "community right to know" rules established by the federal government.

County buildings and facilities have sustained damage due to flooding in the past. Extensive interviews with staff (see Appendix C) resulted in the following characterizations of past events:

- County parks facilities and improvements have been damaged by flood, including the fee booth, picnic tables and pavilions, restrooms, playscapes, fences, electrical and irrigation systems, and trails. Most damage is associated with heavy debris loads carried by floodwaters.
- Moya Park has sustained the most damage in the past decade (cost for recovery has been as high as \$280,000); some improvements have been relocated to higher ground, where flood velocities are expected to be lower (see Appendix E-3).
- The Moya Park Ranger residence has sustained repetitive damage due to flooding, most recently in October 1998 and November 2001. It was not reoccupied after the 2001 event, has since been demolished, and will not be rebuilt.
- At Hamilton Pool, extensive sections of fencing were damaged due to debris loading.
- Lake Travis parks are known to experience flood damage, including damage to docks due to rapid rise. Inundation of park restrooms has caused damage, especially when deep enough to cover roofs and damage shingles.



- The Northeast Metro Park low-water crossing has been damaged by floodwaters eroding its base. Repairs to the crossing will include additional concrete.
- County parks with streams have sustained some bank erosion damage. In Moya Park, repairs were made with riprap and gabions.
- The Vehicle Services building was flooded in November 2001. The cost to clean up the building and vehicles was approximately \$8,000 (see Appendix E-3).
- Damage sustained by County buildings as a result of federally declared disasters has not been covered by FEMA because damaged buildings were determined by FEMA to be either ineligible or “below the \$500,000 deductible” for buildings not insured for flood damage.

5.6 Flood Risks – Roads

Nationwide, flooded roads pose the greatest threat to people during floods. Most of the more than 200 people who die in floods each year are lost when they try to cross flooded roads. Driving into water is the number one weather-related cause of death in Central Texas. Statewide, between 1960 and 1996, 76% of flood-related deaths were vehicle-related (Texas Environmental Center, online).

As illustrated in Figure 5-1, flood hazards for cars vary with both velocity and depth of floodwaters. Many cars will float in less than 24 inches of water. Fast-moving water can quickly wash cars off the road or wash out a low section of road.

Although most roads in Travis County area are unlikely to have deep or fast-moving water during flood conditions up to the level of the 100-year flood, many are still known to flood regularly. Table 5-7, prepared by Travis County’s Road and Bridge Maintenance, provides a list of roads that flood frequently, by precinct. These roads are also shown graphically, in Map 5-5.

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Roads Reported to Flood Frequently

Page 5-23



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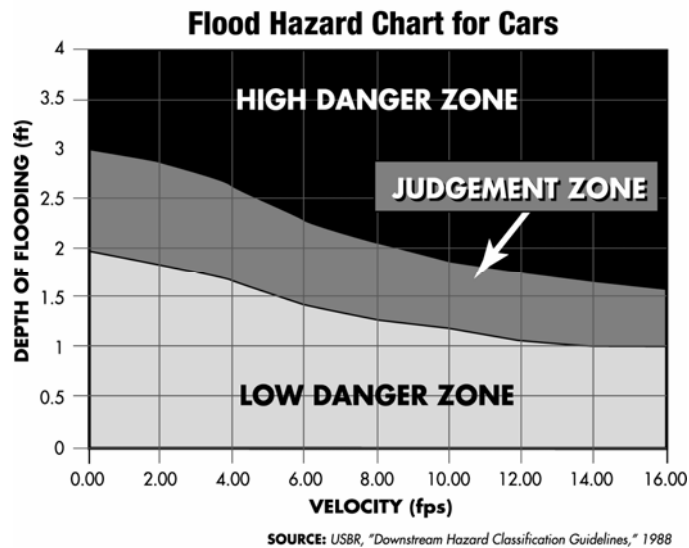


Figure 5-1. Flood Hazard Chart for Cars.

**Table 5-7
Roads Reported to Flood Frequently.**

Flood-Prone Roads (TNR Roads & Maintenance)	
Precinct One Bitting School Rd. @ Hog Eye Rd. Cameron Rd. @ 16300 Block Cameron Rd. @ Ferguson County Line Rd S. of 290E Crystal Bend @ Low Water Crossing Gregg Lane @ FM973 Imperial @ FM 969 Imperial Dr. N. @ Hook Road Jones Rd. Between Hog Eye & Littig Springdale Rd @ Cameron Springdale Rd @Walnut Creek Bridge	Precinct Two Flint Rock @ Low Water Crossing Grand Ave. Pkwy @ Edgemere Grand Ave Pkwy @ Central Commerce Grand Ave. Pkwy.@ Ramble Creek Immanuel @ Killingsworth Lane Old San Antonio @ Onion Creek Pecan St. @ Weiss Lane Picadilly @ Royston Spicewood Springs @ Old Lampasas Spicewood Springs @ Yaupon
Precinct Three Bee Creek Rd @ 4200 Blk. Bee Creek Rd @ R.O. Rd Fall Creek Rd. @ Creek Fitzhugh @ Barton Creek Drive Frate Barker @ Buckingham Gate Great Divide Lime Creek Rd. @ 1700 Blk. Pedernales @ Hamilton Pool Pedernales Canyon Trail @ Hwy 71 Thomas Springs @ Circle Drive Twin Creek @ FM1626	Precinct Four Bluff Springs @ Onion Creek Bridge Bradshaw Rd. @ Old Lockhart Rd Citation @ Whirlaway Doyle Overton Rd. @ Eilers Rd Evelyn @ Tom Sassman Jacobson Rd. Between Alpine and Linden Linden Rd. @ Maschmeir Man of War @ Citation Pearce Rd. @ FM973



Replacing roads and bridges damaged or washed out by floods costs millions of dollars each year. If the damage is caused by a Presidentially Declared Disaster, FEMA may pay up to 75% of the repair or replacement costs, with the remaining 25% covered by the state and local governments. The full costs of a damaging event that is not declared a major disaster must be borne by the state and local communities.

There are approximately 4,700 miles of road in Travis County. Of these, 1,200 miles are County-owned, 500 miles are state-owned, and 3,000 miles are owned by cities or other entities. When building new state roads, the Texas Department of Transportation considers the NFIP's floodplain and floodway requirements to evaluate the impact of new and replacement structures. The County considers floodplain and floodway impacts in its planning and design for County roads and waterway crossings.

The following statistics broadly characterize the flood-related risks associated with roads in Travis County:

- 72.2 miles of County-owned roads are in the mapped floodplain.
- 41.9 miles of state-owned roads are in the mapped floodplain.
- 114.9 miles of city-owned roads are in the mapped floodplain.
- 144 bridges, 10,000+ culverts, and 110 low water crossings.

County roads and low water crossings have sustained damage due to flooding. Staff interviews (see Appendix C) resulted in the following characterizations of past road flooding:

- Jones Road was flooded, scouring the embankment behind the abutment; no structural damage was sustained because the abutment is founded on deep piers.
- Parsons Road experienced erosion at the bridge due to flow alignment; upstream channel work with gabions were installed to divert flow more efficiently through the bridge.
- County maintenance records indicate that little road, bridge, and culvert damage resulted from the November 2001 flood.
- The Christmas 1991 flood caused some road damage.
- Parsons Road is typically affected when Wilbarger Creek floods with water depths of over two feet for 24–48 hours. This usually occurs with 3–4 inches of rainfall. As development expands into the

vicinity, Parsons Road is experiencing an increase in traffic. Non-flood-related improvements to this road are already in the planning phases.

- Woody debris resulting from the December 2001 “Christmas” flood was ground up for mulch and stockpiled in County parks for use in park maintenance. However, due to the large volumes of mulch, some had to be hauled to landfills for disposal.
- Since the mid-1980s, bridge piers have not been undermined by flood events.

5.7 Flood Risks – Hazardous Materials

When floodwaters affect locations where hazardous materials are stored or used, the stage is set for potential effects that go far beyond the physical onsite damage. Certain materials are reactive in water and others may pose health and safety risks if distributed downstream by rising waters.

Most reported hazardous materials fixed sites (handlers, storage) are located in the City of Austin. A database of user addresses is available. In the County, concerns about hazardous materials incidents are focused primarily on transport incidents. Another potential hazard is the stores of chlorine used at the 95 water treatment companies throughout the County, some of which are located within the 100-year floodplain. The Travis County Office of Emergency Management maintains a database of the locations of hazardous materials. Map 5-4 shows 68 locations of hazardous materials that plot as within the mapped floodplain or within a 1,000-foot buffer around the floodplain boundary. Sites within the buffer are shown in part to account for uncertainties in the geocoding of the physical locations of the materials.

Despite the threat, there have yet been no reported hazardous materials incidences related to flooding. Depending on the nature of the hazardous materials and the facilities containing them, it may still be appropriate for facility owners to examine the potential for damage under reasonably anticipated flood conditions – i.e., the 100-year flood. In addition, owners may find it prudent to examine the sites to determine if it is feasible to use mitigation measures that minimize risks.



5.8 Flood Risks – Stormwater Management

Experience shows that most drainage problems in Travis County are not dramatic or life threatening. Many areas experience accumulations of rainfall that are slow to drain away, which may cause disruption of normal traffic, crop damage, soil erosion, and water quality problems.

The County has begun to keep records of reported drainage problems (water in yards, ditches) and anticipates developing criteria to determine priorities for resolving certain problems.

The County has the authority to adopt reasonable specifications for drainage for streets and roads. County stormwater management provisions, included in the drainage and subdivisions regulations (Chapter 82), require that waterways, drainageways, and floodplains be shown on subdivision plans. Drainage easements must be sized to contain storm discharges and be protected from erosion and scour.

Subdivision proposals with impervious cover that exceeds 20% of the total land area must be accompanied by a drainage plan. The plan must include “controls that may be required to attenuate the effects of the proposed increase in stormwater to, from, across or along roadways within or adjacent to the subdivision” (Section 82.302(e)(3)).

5.9 Flood Risks – Dams

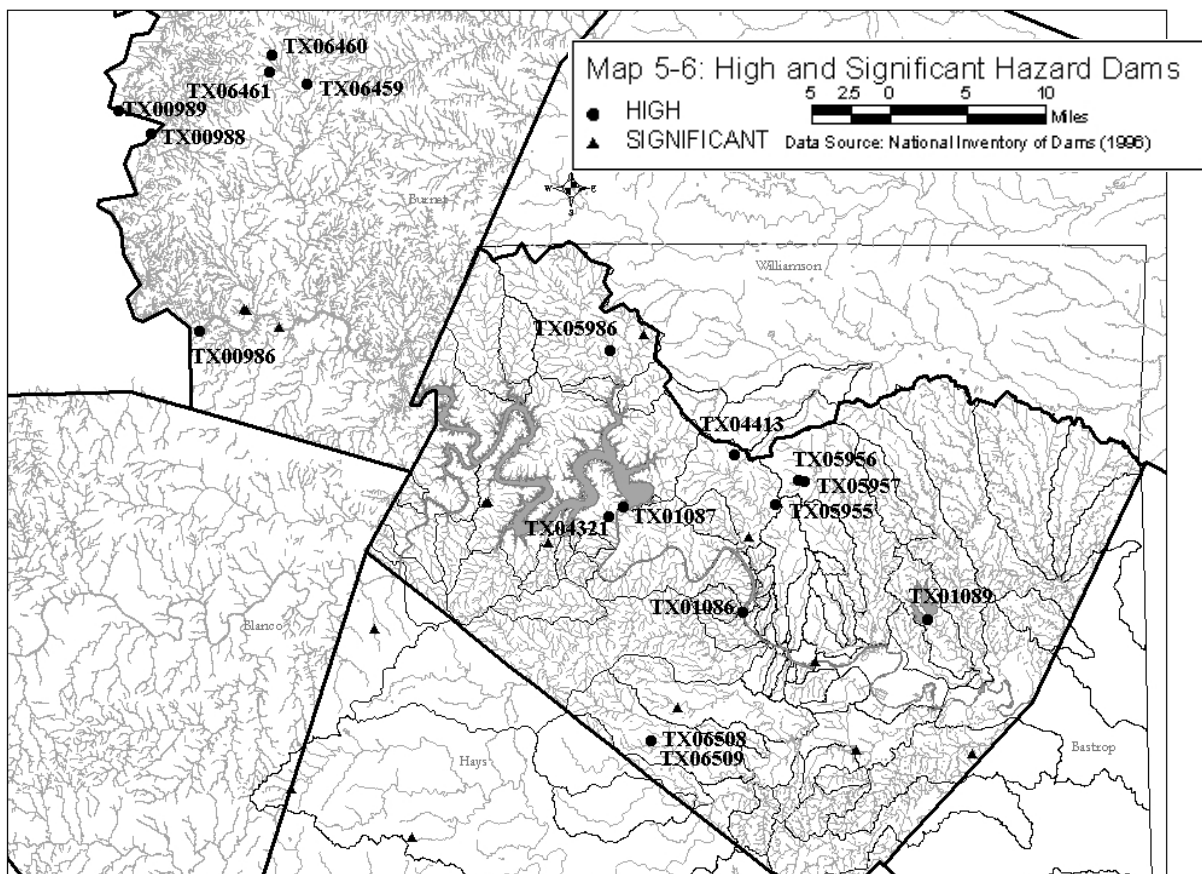
FEMA and the U.S. Army Corps of Engineers maintain the National Inventory of Dams (1998), a database of high and significant hazard dams. For the most part, data are provided by state agencies responsible for regulation and inspection of dams or by the Corps of Engineers.

The Lower Colorado River Authority (LCRA) regulates dams on the Colorado River and has an extensive dam safety program that includes inspections, maintenance, and repair. Other dams are regulated by the Texas Council on Environmental Quality (formerly known as the Texas Natural Resources Conservation Commission).

Dams are categorized into three hazard potential classes:

- **High hazard potential** dams are those whose failure or operational failure will probably cause loss of life and/or significant infrastructure losses.
- **Significant hazard potential** dams are those whose failure or operational problems are unlikely to cause loss of human life, but can cause economic loss, environmental damage, disruption of lifelines, or other concerns.
- **Low hazard potential** dams are those whose failure would probably cause no loss of human life and only low economic and/or environmental losses, which would typically be limited to the dam owner's property.

Map 5-6 shows the location of high and significant hazard dams in Travis County and in watersheds that drain through the County. Mapped locations are based on latitude and longitude data contained in the National Inventory of Dams. Table 5-8 summarizes certain information related to the 15 high hazard dams affecting Travis County. Based on National Inventory data, it appears that only the Marshall Ford Dam at





Lake Travis has an emergency action plan in place. Without dam inundation zone determinations, at-risk people, buildings and infrastructure cannot be determined.

Table 5-8
High Hazard Dams Affecting Travis County.

Dam Name Owner	NID # Waterway	Year Built Primary Purpose	Emergency Action Plan
Alvin Wirtz Dam Lower Colorado River Authority	TX00986 Colorado River	1951 Hydroelectric	No
Tom Miller Dam City of Austin	TX01086 Colorado River	1939 Water Supply	No
Marshall Ford Dam DOI BR	TX01087 Colorado River	1942 Flood Control	Yes
Decker Creek Dam City of Austin	TX01089 Decker Creek	1967 Other	No
Apache Lake Dam Resort Properties Co	TX04321 Tr-Colorado River	1969 Recreation	No
Hidden Lake Dam Ann McCulloch	TX04413 Tr-Bull Creek	1969 Irrigation	No
Arboretum at Great Hill Trammell Crow Company	TX05955 Tr-Bull Creek	1985 Flood Control/SWM	No
North Loop Detention Dam No. 1 Trammell Crow Company	TX05956 Walnut Creek	1984 Flood Control	No
North Loop Detention Dam No. 2 Trammell Crow Company	TX05957 Walnut Creek	1984 Flood Control	No
Nameless Valley Ranch Dam No 1 Seventh Day Adventist	TX05986 Palmetto Hollow	1962 Recreation	No
Hamilton Creek WS SCS Site No. 1 Hill Country SWCD	TX06459 Tr-Hamilton Creek	1986 Flood Control	No
Hamilton Creek WS SCS Site No. 2 Hill Country SWCD	TX06460 Hamilton Creek	1986 Flood Control	No
Hamilton Creek WS SCS Site No. 3 Hill Country SWCD	TX06461 Tr-Hamilton Creek	1986 Flood Control	No
Circle C Ranch – N. Dam Circle C Mud	TX06508 Slaughter Creek	Unknown Flood Control	No
Circle C Ranch – S. Dam Circle C Mud	TX06509 Slaughter Creek	Unknown Flood Control	No

5.10 Flood Risks – Summary

As described in Section 5.3, Travis County GIS uses the FEMA Q3 digital flood data are used in the County’s GIS for flood hazard identification and assessments of risk. The data, combined with the footprint information for buildings, allow determination of residents and assets of the built environment that are “at risk” only by identifying whether such assets are “in” or “out” of the flood hazard area. No other characterization of flood risk can be made, i.e., depth of flooding or whether houses are in the floodway or the flood fringe.

Table 5-9, based on a form provided in the State’s *Mitigation Handbook* (DEM 21) is a summary of flood risks. For the purpose of this table, number of people per home is based on the U.S. Census value of 2.47 occupants per household for the Austin/Travis area. In addition, the dollar values for private property are based on average assessed values, and are not intended to imply actual future damage costs (see Section 5.14). Special facilities include fire stations and schools (nursing homes and day care centers are not identified in the County’s GIS).

Table 5-9
DEM 21: Vulnerability and Risk Assessment Worksheet for
Flood Hazards.

	Precinct 1	Precinct 2	Precinct 3	Precinct 4	Totals
People (est)	1,803	531	8,855	5,422	16,611
Housing (smaller than 4,000 sf)	730 \$169M	215 \$29.7M	3,585 \$828M	2,195 \$296M	6,725 \$1.322B
Commercial Facilities (larger than 4,000 sf)	0	0	2 \$2.37M	0	2 \$2.37M
County-owned buildings	1	1	2	2	6
Critical Facilities	0	0	0	0	0
Special Facilities (schools; fire strn)	2	0	0	1	3
Infrastructure & Lifelines	3	1	27	1	32
HazMat sites (incl 1000' buffer)	16	14	25	10	65



5.11 Winter Storm Risks

Infrequent, severe winter storms have affected Travis County in recent years. Typically, damage is limited to downed trees and power lines that restrict travel, interrupt electrical power, and cause water main breakage. Winter storms in 1996 resulted in the EOC being activated for three days to coordinate countywide emergency service delivery. A major storm in 2000 caused widespread damage in the Balcones Canyonlands Preserve.

When ice storms are predicted, bridges are sanded to improve road safety. Sand is stockpiled for spreading on bridges when icy conditions occur, with County trucks equipped with sand spreaders. The state's ice response plan addresses major roads throughout the County. Statistics on weather-related deaths (Section 5.2.2) indicate that in the seven-county Greater Austin area, 4% of all weather-related deaths have been associated with winter storms.

Variations in winter storm risks to people and property cannot be distinguished by area; the hazard is reasonably predicted to have uniform probability of occurrence (rare) across the entire County. As listed in Table 5-10, all people and assets are considered to have the same degree of exposure. Special facilities include fire stations and schools (nursing homes and day care centers are not identified in the County's GIS).

Travis County is in a climatic region that is extremely unlikely to experience snow depths sufficient to cause property damage such as collapsed roofs. Burst pipes do cause minor property damage, and icing causes transportation problems and affects power lines. However, on the whole, Travis County is not exposed to any significant risk of property damage due to winter storms. Past winter storms have caused limited damage to buildings, due to the extreme rarity of snow in amounts that would cause property damage, such as collapsed roofs, and as such, there is no property damage expected. This statement is true for both existing and future development throughout the County.

To estimate potential dollar value of losses to existing buildings, Travis County evaluated the prior loss data from the National Climatic Data Center, (<http://lwf.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>). This

data indicated that between 1950 and 2002, there were seven winter storm events that caused \$7,500,000 in property damage. Dividing this \$7,500,000 in prior actual losses by the span of years in which these losses were incurred, it is estimated that Travis County has an estimated annual loss from Winter Storms in the amount of \$144,000.

The following approach was used to estimate the potential losses to new future buildings. Given the very low estimate of annual loss from Winter Storms for existing buildings, and the relative small number of new buildings in relationship to existing buildings, the estimate of damage to new buildings is zero.

5.12 Wind and Storm Risks

Significant wind events that have affected Texas are associated with thunderstorms and tornadoes. Thunderstorms are frequent in Texas and occur throughout the year, with highest frequency during the spring and summers months. Often, damage attributed to tornadoes is really caused by violent thunderstorms. Variations in wind and tornado risks to people and property cannot be distinguished by area; the hazard is reasonably predicted to have uniform probability of occurrence (rare) across the entire County. As listed in Table 5-10, all people and assets are considered to have the same degree of exposure. The dollar values shown for private property are based on average assessed values, and are not intended to imply actual future damage costs (see Section 5.14).

Statistics provided in Section 5.2.2 indicate that in the seven-county Greater Austin area, 30% of weather-related deaths have been associated with tornadoes, with an additional 7% associated with lightning and severe thunderstorms combined.

County staff reported past storm damage, including:

- Lightning and high winds damaged trees and sport field light poles in County parks in May 2001; repairs were under warrant.
- Lightning struck a County-owned chilling tower in 2000; the cost of repairs was covered by insurance.
- The Exposition and Heritage Center in East Austin sustained damage to windows due to wind in March 1995; the repairs cost \$15,300 and were covered by insurance.



- In 1997, a tornado caused damage in the Hazy Hills subdivision (east of the Pedernales River at Highway 71). There was tree damage, a dozen roofs blown off, and several overturned mobile homes.

Table 5-10

DEM 21: Vulnerability and Risk Assessment Worksheet for Winter Storms; High Wind.

	Precinct 1	Precinct 2	Precinct 3	Precinct 4	Totals
People (est)	30,653	24,749	83,733	26,404	165,539
Housing (smaller than 4,000 sf)	12,410 \$2,864M	10,020 \$2,351M	33,900 \$7,831M	10,690 \$1,440M	67,020 \$14,450M
Commercial Facilities (larger than 4,000 sf)*	590 \$699M	480 \$568M	3,100 3,672M	610 \$722M	4,780 5,662M
County-owned buildings	10	9	21	59	96
Critical Facilities	0	0	0	0	0
Special Facilities (schools, fire stn)	5	9	26	9	49
Infrastructure & Lifelines	3	3	27	1	34
HazMat sites (incl 1000' buffer)	28	23	79	22	152

* See note for Table 5-3 for average size and value.

To estimate potential dollar value of losses to existing buildings, Travis County evaluated the prior loss data from the National Climatic Data Center, (<http://lwf.ncdc.noaa.gov/oa/climate/severeweather/extremes.html>). See Table 5-11 below for a summary of actual prior losses within Travis County.

Table 5-11
Prior Wind Events & Estimate of Dollar Value of Potential Losses.

Wind (1950 – 2002)			
Tornados		Percent	
F0	21	38%	\$ 603,000
F1	23	41%	\$ 1,231,000
F2	8	14%	\$ 251,000,000
F3	3	5%	\$ 500,000

Table 5-11
Prior Wind Events & Estimate of
Dollar Value of Potential Losses.

Wind (1950 – 2002)			
Tornados		Percent	
F4	1	2%	\$ 15,000,000
F5	0	0%	\$ –
Total Tornados	56		
Tstorm/HighWind	151		\$ 7,400,000
Total			\$ 275,734,000
Annualized Estimated Losses (Actual historical losses divided by 52 years (2002–1950))			
\$275M divided by 52 years			\$ 5,302,577

This data indicates that between 1950 and 2002, there were 56 tornados and 151 thunderstorms/High wind events that caused \$275,734,000 in property damage. Dividing this \$275,734,000 in prior actual losses by the span of years in which these losses were incurred, it is estimated that Travis County has an annual loss from high wind hazards/tornadoes in the amount of \$5,302,577.

The following approach was used to estimate the potential losses to new future buildings. As indicated in Table 5-10, total Travis County building values are estimated at \$20 billion. Using historical loss data, it is estimated that these \$20 billion in buildings will experience annual losses in the amount of a little over \$5 million, which is .03% annual estimated damage. Given that there is no way to predict the geographic location of high wind/tornados, existing and new construction are at equal risk. Therefore, it is estimated that there will be .03% of new building values damaged on an annual basis as a result of this hazard.

5.14 Wildland Fire Risks

No formal record exists of the number of wildfires occurring in Travis County over the past decade. Records do exist for the brief period from mid-1997 to October 1998, reporting that 693 wildfires during this time period. It is also known that one of the worst wildfires in recent memory,



known as the Dessau Road Fire, swept through more than 600 acres southwest of Pflugerville in 1994.

Risks associated with wildfire are significant in western Travis County, in what is known as the Hill Country. The hilly terrain tends to concentrate development in limited areas, often encroaching onto forested areas. This development pattern increases wildfire risks to structures in the urban-wildland interface areas. In the Balcones Canyonlands Preserve, the large number of fallen trees and tree branches resulting from the major ice storm in 2000 serve as potential fuel for wildfires. Because of the time it takes fallen debris to deteriorate, threats remain elevated for years.

Wildfires have occurred in the area, although such incidents have not prompted activation of the County's Emergency Operations Center. The County maintains memoranda of understanding with state and federal agencies, adjacent counties, and all Emergency Services Districts in the area to support response in the event of wildfire. The City of Austin, using FEMA funding, is working with jurisdictions in the region to perform fire risk assessments, which will include developing fire hazard maps and identifying ignition sources and vulnerable vegetation types. A plan to focus cooperative resources has been proposed.

Thousands of homes worth millions are located in western Travis County, many are adjacent to or in the interface with forested lands of the Balcones Canyonlands Preserve. No estimate is available on potential dollar damages from wildland fires.

As stated in section 4.1.5, in terms of probability, although incidents are expected to occur more frequently due to the increase in human activity in forested areas, there is no acceptable mechanism to assign a probability to specific fire occurrences. No estimate is available as to the dollar value damage to existing or future buildings due to wildfires. However, history is a good indication of the future and since no prior wildfires have resulted in building losses, it is estimated that this will carry into the future.

5.18 How Travis County Estimates Impacts

After a natural hazard event causes damage, Travis County undertakes a rapid estimate of the impacts to buildings. Impacts to both County property and private property are examined.

In the event of damage to Travis County owned property or facilities, the initial damage assessment is conducted by trained staff in the Risk Management office. Because the County's buildings are covered by property loss insurance, the insurer generally requires additional damage assessments that go into more detail. These assessments are overseen by a third party administrator to insure accuracy in estimating losses. For the County's non-building items such as picnic tables, trail damage, fencing, etc. that are normally associated with parks in the floodplain area, County personnel prepare damage assessments based upon experience with repairs or replacement costs. If damage is sustained by building contents, such as computers or other equipment, estimates would also be based on replacement costs or experience with repairs.

When privately owned property is damaged by natural hazards, The County attempts to contact owners within the first 24 hours to gather estimated costs. This activity is usually started in the Emergency Operations Center during the activation phase. The Disaster Summary Outline is initially generated based on early estimates and is subsequently amended as more accurate numbers are received. Depending on the scope of an event, the American Red Cross conducts a "windshield assessment" to assist the County with estimating the number of households affected and other recovery activities, but it does not develop estimates of the costs of damage.

For private residences and small businesses, the County has access to the Travis County Appraisal District's database. The data can be used to prepare a rough estimate based upon the valuation of homes in an affected area and the number of homes/business identified as showing damage. The County does not gather estimated damage costs from insurance companies.



For non-building damage, such as roads, TNR's staff who are experienced in estimating costs for non-disaster related work prepare cost estimates.

Part 6

Travis County Processes

6.1 Travis County Government Structure

The Texas Constitution spells out the structure of County governments, thereby making counties functional agents of the state. Thus, counties, unlike cities, are limited in their actions to areas of responsibility specifically spelled out in laws passed by the Texas Legislature.

At the heart of Texas county government is the Commissioners Court, composed of a county judge and four precinct commissioners (see Figure 1-2). Although this body conducts the general business of the county and oversees financial matters, the Texas Constitution established a strong system of checks and balances by creating other elective offices in each county, including the county attorney, county and district clerk, county treasurer, sheriff, tax assessor-collector, justice of the peace, and constable. The county auditor is appointed by the district court.

Travis County government is generally organized based on this prescribed structure. With respect to planning for and responding to natural hazard events, the key elements of Travis County organization (www.co.travis.tx.us) are:

- **Commissioners Court** is the governing body of Travis County. As a group, the county judge and the four commissioners are the chief policy-making and administrative branch of County government. Among their many functions, the court is responsible for the County's budget, sets the tax rate, determines fees for many County services, and determines how the collected revenues will be distributed among County departments to provide services to the community.
- **Transportation & Natural Resources (TNR)** is a diverse department, responsible for the engineering, design, construction, and maintenance of Travis County roads, drainage, and bridges; fleet services for all County vehicles and equipment; environmental protection; solid waste management and resource conservation; park land and natural resource preservation; capital improvement projects; land development review, including subdivision review; permits; and floodplain management regulations in Travis County.
- **Emergency Services** provides for the safety of Travis County residents through emergency preparedness and response. The Office of Emergency Management serves as the coordinating point of disaster preparedness, mitigation, response, and recovery capabilities for Travis County in cooperation with the County's various municipal governments. Travis County assists in staffing and sponsoring a joint City of Austin-Travis County Emergency Operations Center.



- **Facilities Management** coordinates the construction of new County facilities, implements and monitors how those facilities are used, coordinates the maintenance and renovation of existing County property, and negotiates contracts.
- **Agricultural Extension Services** conducts educational programs and provides information in the areas of family and consumer sciences, agriculture, horticulture, natural resources, 4-H, and youth programs.

The State of Texas has not specifically authorized counties to adopt building codes other than fire safety for commercial buildings. Travis County does not administer a building code and has not been assigned a Building Code Effectiveness Grading Schedule classification (BCEGS). A number of Emergency Service Districts administer a fire safety code. The Fire Marshal conducts fire safety inspections of public buildings, day care centers, nursing homes, and schools. In 2002, 29 inspections were conducted.

The State of Texas has not specifically authorized counties to develop and adopt comprehensive plans for land use or zoning. Therefore, Travis County does not use these development tools.

6.2 How the County Addresses Hazards

Travis County members of the Mitigation Planning Committee were interviewed to gain an understanding of awareness of hazards and how they are addressed, and to gather information about damage associated with past hazard events. Detailed summaries were prepared of the issues discussed during those interviews (Appendix C) and at the committee meetings (Appendix B).

The following is an overview of how the different entities that make up Travis County government address hazards. Key accomplishments are highlighted:

Transportation & Natural Resources. As described in the previous section, TNR is a diverse department responsible for the engineering, design, construction, and maintenance of roads, drainage and bridges; fleet services for County vehicles and equipment; environmental protection; solid waste management and resource conservation; park land

and natural resource preservation; capital improvement projects; and land development review, permitting, and floodplain management regulations.

Transportation & Natural Resources: Environmental Coordination.

This office is charged with coordinating development of environmental policies and intra-departmental review of development proposals. It conducts compliance reviews of specific County capital projects (primarily new roads and bridges) and serves a key function in coordinating with state and federal environmental programs. Identifying, applying for, and managing grants for a variety of projects are ongoing functions. Grant-funded projects have included post-disaster activities, parks development, and solid waste management.

Transportation & Natural Resources: Development Services.

Development Services processes applications for subdivisions, development permits, utility permits, driveway permits, and onsite sewerage permits. In a number of respects, jurisdiction is shared, for example the County coordinates with the City of Austin on reviews of subdivisions within the Extra-Territorial Jurisdiction area, and the Lower Colorado River Authority issues permits for septic systems located within 2,250 feet of the normal lake shore. With the passage of a recent state law (House Bill 1445), coordination of regulations within the extra-territorial jurisdictional areas that surround the incorporated cities is growing in importance.

Staff Capabilities

Three members of Development Services are nationally Certified Floodplain Managers (2002).



The functions of TNR Development Services that address threats from natural hazards, particularly from flood hazard, are described below and include processing proposals for development, onsite sewage systems, improvements of existing buildings, subdivision of land, and stormwater management.

Processing Development Proposals: Travis County requires all development proposals to be reviewed and regulations govern development within floodplains and drainageways (Travis County Code, Chapter 64, adopted on March 29, 1982). If a proposal is on a lot that has no designated floodplain areas, approval is granted by issuance of a Class “A” permit. Class “B” permits are issued for proposals on lots that have designated floodplain and drainage areas, even if the proposed development does not encroach into the floodplain or drainageway. Given recent flood experience, developers and engineering consultants generally understand the importance of building on higher ground.

Lake Travis

TNR does not issue development permits for houseboats – they are not structures because they can move under their own power and are controlled by LCRA.

Table 6-1 shows the total number of development permits issued by TNR in 2001 and 2002, by precinct. Not surprisingly, new development is occurring most rapidly in Precinct 2 (north Austin) and Precinct 3 (around Travis Lake).

Table 6-1
Building Permits Issued* in 2001 & 2002, by Precinct.

	Precinct 1	Precinct 2	Precinct 3	Precinct 4	Total
Calendar Year 2001					
Class A	176	847	744	336	2,103
Class B*	34	58	133	53	278
Calendar Year 2002					
Class A	562	587	1,020	560	2,729
Class B*	43	46	149	66	304

* Not all Class B permits involved a building in the floodplain.

Class “B” permits that authorize buildings in flood hazard areas contain specific notations regarding the minimum elevation of the lowest floor and the requirement for an Elevation Certificate. Permittees are required to execute a “certificate of conformity” to acknowledge and certify acceptance of the permit conditions and special provisions. Submission of the Elevation Certificate, and signature by the County, is required before the County deems the permitted activity is compliant. The County maintains a database of countywide elevation information.

Manufactured Housing

- *10% of all permits are issued for manufactured housing units.*
- *In flood hazard areas:*
 - *Dry stack block piers are not allowed; and*
 - *Foundations higher than 6 feet must be professionally engineered.*

Permitting for Substantial Improvements: Property owners proposing to substantially improve buildings or to repair substantially damaged buildings are required to obtain a development approval if the buildings are located in floodplains or drainage easements. Due to flood events in recent years, Travis County has considerable experience with this



provision. If proposed improvements or repairs cost 50% or more of the market value of the building before the improvement/repair, the substantial improvement provision requires that buildings not conforming with NFIP requirements be brought into compliance. In support of this provision, the County accumulates costs of any repair, reconstruction, or improvement made to a structure since March 28, 1995. These costs are applied towards the 50% figure for a given structure. Applicants for improvements are notified of this “cumulative provision”, which, as of mid-2002, has not yet triggered enforcement of the substantial improvement provision.

Reviewing and Approving Subdivisions: Subdivisions are approved pursuant to standards for streets and drainage (Travis County Code, Chapter 82, revised August 28, 1997). Based on the past six years of records, an average of 167 plans for new subdivisions are submitted for review each year. Most subdivision plans are accompanied with full engineering studies to delineate floodplain boundaries and drainage easements, which are recorded on plats and referenced for subsequent permits to construct individual buildings. Plat notes generally state that no construction in drainage easements (which include the mapped floodplain) is allowed without County approval.

When evaluating and approving new subdivisions, the County works with developers to identify and implement ingress and egress to adjacent communities that have a history of flooding and/or access restrictions. In general, efforts are made to avoid putting new roads in flood hazard areas.

Permitting for Onsite Sewage Facilities: Floodplains are also addressed by Travis County in the review of applications for onsite sewage facilities. The County, designated by the state as the authorized agent (i.e., permitting authority) for unincorporated areas of the County, administers standards for planning materials, construction, installation, alteration, repair, extension, operation, maintenance, permitting, and inspection of onsite sewage facilities. Among other features, site plans for these facilities must show topography and the 100-year floodplain.

Any potential onsite sewage facility within the floodplain is subject to special planning requirements, such that the facility is to be located so it will not be damaged during a flood and result in contamination of the environment. Permit applicants must show how tank flotation will be eliminated. If a facility is proposed in a floodway, they must demonstrate that the system will not increase flood heights, that certain components will be buried without adding fill, and that non-buried components will be elevated above the 100-year flood elevation. As mandated by the Austin/Travis County Health Department, septic tank system drain fields are not allowed in floodplain areas.

Requiring Stormwater Management: Provisions for the management of increased stormwater runoff are included in the County subdivision regulations. Increases are managed to avoid increasing flood damage. The most common management technique is through ponds placed in commonly owned areas, typically owned by homeowner associations or municipal utility districts. The County has begun maintaining records of reported drainage problems (such as standing water in yards and ditches). At this time, there are no criteria for resolution of such problems and the County does not have a “master drainage plan.”

Addressing Other Hazards: The County subdivision regulations contain two requirements to deal with non-flood-related natural hazards:

- **Tornadoes.** Tornado shelters are required in all new mobile home parks (Sec. 232 Local Government Code).
- **Forest fires.** Forest fire is a hazard with important implications for evacuation. Thus, single access streets are not permitted to cross areas having a high wildland fire protection rating, as determined in accordance with the National Fire Protection Association Bulletin NFPA 2999, Protection of Life and Property from Wildfire (1992).

Some key accomplishments due to the efforts of TNR Development Services are described below:

- Materials to help flood-damaged property owners understand the permit requirements for repairing damaged property. After recent events, meetings were held with victims to help with recovery.
- In light of recent flood experience, most developers and engineering consultants understand flood hazards and are receptive to locating



buildings to avoid encroaching onto floodplains and drainage easements.

- In the past 10 years, only one variance was approved to allow a building to be 0.3 feet below the required elevation (including freeboard). The building's lowest floor is still 0.7 feet above the Base Flood Elevation, and thus compliant with the minimum NFIP requirements. The discrepancy in elevation was discovered after construction.
- The most common method of elevation for homes is on block piers, although use of earth-filled foundation walls (stem walls) is increasing. If fill is used, owners are advised of FEMA's compaction requirements. Around Lake Travis, where flood depths often are greater than several feet, other foundation types are more common, such as steel or wood pilings.
- As part of the County subdivision regulations, new access roads may have no more than 9 inches of water over their surface during passage of the Base Flood.
- Permanent survey monuments are required in all new subdivisions, which will improve access by surveyors when preparing certificates of ground and floor elevations of buildings in flood hazard areas.
- Septic tank system drain fields, which are allowed in floodplain areas on a case-by-case basis after engineering review, are regulated by the Austin/Travis County Health Department. Tanks must meet state requirements with regard to distance from water sources, have backflow valves, and be designed to prevent flotation.

Transportation & Natural Resources: Road & Bridge Maintenance.

Primary functions of Road & Bridge Maintenance include rebuilding and maintaining approximately 1,200 miles of County-owned roads, including mowing and cleaning drainage ditches. Maintenance includes debris removal within the County's right-of-way. If debris appears to pose an imminent threat, maintenance crews can go outside the right-of-way.

Approximately 10,000 culverts and 144 bridges (clear span of +20 feet) are located within the County. Routine inspections are conducted to evaluate the structural conditions of bridges and culverts and to check for scour.

The County has 110 low water crossings that are expected to flood even under minor increases in flow rate. Although originally installed on roads

with low traffic volume, a number of these crossings now carry considerably increased numbers of vehicles.

The Road & Bridge Maintenance staff has significant responsibilities related to flooding. On a rotating basis, staff is on call after-hours throughout the year. When floods are predicted, emergency teams are organized, roads are closed (based on experience), and teams are prepared to respond to problems. While damage to roads has been minimal (primarily shifted asphalt), debris has been the biggest flood-related expense as far as road repair. After heavy rains, maintenance crews inspect areas that historically have had problems to check for debris and damage.

With respect to non-flood hazards, Road & Bridge Maintenance reports the following:

- **Winter storm.** Sand is stockpiled and ready to spread on bridges when icy conditions occur.
- **Forest fire.** Equipment has been used to assist with forest firefighting efforts.

Transportation & Natural Resources: Engineering & Planning.

Planning, design, and engineering of County roads are the primary responsibilities of Engineering & Planning. Developers must build roads to County standards before the County takes ownership. Designs are based on traffic volume and road classification. Most waterway crossings and highway projects are funded by the County. The Texas Department of Transportation periodically inspects every bridge with a clear span of more than 20-feet to examine structural integrity and look for evidence of scour. County bridges and culvert openings are generally sized to:

- Minimize floodway impacts,
- Result in no more than 6–9 inches of water over the road surface during the Base Flood,
- Minimize backwater increases to the water surface of the Base Flood (typically 3–4 inches, but not more than 1-foot), and
- Protect piers and abutments against erosion.

The County has not operated a landfill since 1982; however, the Environmental Project Manager monitors closed landfills and addresses



site conditions such as groundwater contamination and surface erosion. The Texas Council on Environmental Quality regulates private landfills, including the five major commercial landfills that are active. Floodplain impacts have occurred and continue to occur. Some past events are described below:

- Now located in Austin and owned by the YMCA, the “Highway 183 Landfill” includes large parts of the floodplain of Walnut Creek. In 1995, the County stabilized about 350 feet of streambank with gabions to address active erosion.
- Inactive for more than 20 years, the “Highway 290 East Landfill” includes portions of the Walnut Creek floodplain. The County has implemented erosion control measures at this landfill.
- A landfill owned by the City of Austin is situated adjacent to Moya Park, across Onion Creek. It currently accepts only Type IV construction debris. In the early 1990s, saturated ground conditions caused a mass movement of material into the creek, causing flooding. The County subsequently installed gabions on the park side to address the erosion.

Landfills and Floodplains

In 2002, the County modified Chapter 64 to establish a 500-foot buffer extending from the landward boundary of the floodplain; solid waste facilities shall not encroach onto this buffer.

Transportation & Natural Resources: Inspections. Inspectors are charged with performing inspections of the County’s capital projects and permitted activities, with particular emphasis on Class “B” development permits (activities on that affected by floodplain or drainage). A formal enforcement policy sets forth procedures to inform property owners of permit requirements, to encourage compliance, and to allow referral of unresolved situations for legal action. Inspectors routinely check for unpermitted activities, including buildings and fill or dumping. If a permit is not produced during inspections, a “red tag” is issued and work suspended until a permit is obtained.

As of mid-2003, the inspection staff includes one lead inspector and six construction inspectors. On average, at least one inspection is performed for all Class “B” permits and all permits for non-residential buildings. Only about 20% of Class “A” permits are inspected. Table 6-2 shows inspections for calendar year 2002, by precinct.

Table 6-2
Inspections in 2002, by Precinct.

	Precinct 1	Precinct 2	Precinct 3	Precinct 4	Total
Calendar Year 2002					
Class A	33	53	78	27	191
Class B*	17	14	64	15	100
Non-resid	49	61	64	50	224

Transportation & Natural Resources: Park Planning. Every five years, the County undertakes a revision to its comprehensive master plan for parks and recreation. The revision cycle is conducted according to state guidelines and includes an evaluation of population growth and trends in park usage and demand.

The most recent master plan, entitled *Parks 2000: A Master Plan for Travis County Parks*, did not alter the goal and objectives of the previous master plan. As stated in the master plan, the goal of Travis County Parks is “to provide increased, diverse recreational opportunities for both citizens of and visitors to Travis County in a manner that complements the management and protection of our natural and cultural resources for the enjoyment of future generations.” As demonstrated by approval of bonds in 1997 and 2001 to support park development, the citizens of the County support the master plan’s goal and objectives, which also include acquiring and managing land of significant environmental value and protecting and improving environmental quality of natural resources.

The 2000 master plan revision notes that land use concepts are “shaping forces.” Thus, parks are ideally sited as destination points along a larger, interconnected system of parks and greenways. Open space is intended for both active and passive uses, with passive uses featuring a variety of



elements, including surface waters, wetlands, and floodways. The concept of “greenways” is promoted to link areas and “to protect significant linear features such as waterways, ridgelines, and wildlife corridors.”

The following key accomplishments exemplify how Park Planning addresses floodplain issues:

- The new park and open space classifications include both lake/river parks and greenways. One of several factors that influence final site selection for metro parks is the presence of floodplain limits.
- A park planning highlight is the proposed incremental development of the County’s first greenway, building on the Onion Creek floodplain buyout program.
- Richard Moya Park was recently reclassified as a greenway, in part because “frequent and severe flooding from Onion Creek has resulted in the decision not to reconstruct capital-intensive sports facilities at this site.”
- Due to flood damage in Moya Park, the County revised a policy that had allowed development of recreational facilities in the floodplain. The new policy prohibits placement of active recreational uses in areas that are at risk of flooding.
- New and replacement park improvements in the floodplain are undertaken in ways to minimize flood damage, e.g., reconstructed restrooms are designed to flood with minimal damage, and to be cleaned out easily.

Transportation & Natural Resources: Balcones Canyonlands Conservation Plan. Located in western Travis County, the Balcones Canyonlands Preserve contains 26,361 of the 30,428 acres set aside as protected habitat by the Balcones Canyonlands Conservation Plan. It includes land owned or managed by several property owners, including Travis County. The Preserve system was established to meet the terms and conditions of a regional permit, issued in 1996, by the U.S. Fish & Wildlife Service under Sec. 10(a)(1)(B) of the Endangered Species Act.

Developed over a period of seven years, the Conservation Plan is designed to assist landowners and developers in Travis County in complying with the requirements of the federal Endangered Species Act. The Plan is a voluntary, streamlined alternative to obtaining an individual 10(a) permit from the U.S. Fish and Wildlife Service. It seeks to strike a

balance between the demands for growth and preservation of quality of life through setting aside more than 30,000 acres of protected habitat. The plan covers the "take" of the golden-cheeked warbler, the black-capped vireo, and six karst invertebrates that are listed as endangered. An additional 25 karst species and two plants, candidates for endangered species listing, are also covered. No aquatic vertebrate species are covered at this time.

Significant portions of the Preserve are uplands or steep canyons where the land is so steeply sloped that stream channels run in narrow valleys with little or no floodplain.

Wildfire is the most significant hazard threatening the lands of the Preserve, due not only to the nature of the vegetation and geography, but also the build-up of woody materials that results when ice storms cause tree damage and limbfalls. There is a fair amount of urban-wildland interface due to private in-holdings and private development that back up to Preserve boundaries, raising concerns about fire hazards. West of IH-35, the hilly terrain results in more condensed development in those areas with buildable land, increasing the risk of wildfire and consequently increasing risks to buildings. The County has memoranda of understanding in place with state and federal agencies, adjacent counties, and all Emergency Services Districts in the area to provide coordinated fire response within the Preserve. County efforts have focused on education and outreach activities to encourage risk reduction.

The Balcones Canyonlands Preserve partners are cooperating with the City of Austin to develop fire risk assessments. This initiative includes mapping fire hazards and identifying ignition sources, vegetation types, and density in order to plan and focus resources. This initiative is supported by pre-disaster mitigation funding from FEMA.

Transportation & Natural Resources: Planning and GIS. The Geographical Information System (GIS) technology used by Planning and GIS allows the graphical representation of spatial information to provide an organized view of a community, its environment, and its development impacts. Analysis of the interrelationships among many types of information is a key function of the Travis County GIS.



The digital floodplain layer (known as Q3) of the Travis County GIS was prepared by FEMA using Flood Insurance Rate Maps. Other types of data and map layers are available and were used to create the characterizations of hazards and risks included in Part 4 and Part 5 of this Plan.

Office of Emergency Management. The Travis County Department of Emergency Services, Office of Emergency Management (OEM), provides for the safety of residents through emergency preparedness and response. Founded in 1992 to comply with state and federal regulations, OEM maintains the County's Emergency Operations Plan (EOP), which covers the County and 10 cities. The primary purpose of the EOP is to promote County preparedness in handling disasters by coordinating emergency planning and response, defining responsibilities, and establishing protocols. The County operates a joint Emergency Operations Center with the City of Austin and the City of Pflugerville. The center will also house staff from the Texas Department of Transportation and Capital Metro. The OEM coordinates mitigation and recovery in cooperation with other governmental units.

The County's Public Safety Answering Program is a system that receives emergency calls and routes them to the appropriate police, fire, or EMS dispatcher. Outside the City of Austin, 13 Emergency Service Districts (ESDs) serve the County, providing fire and emergency medical services. The ESDs coordinate through the County if incidents require additional resources.

Natural disasters within Travis County that have caused loss of life include floods, windstorms, tornadoes, ice storms, and drought. In the last decade, OEM has helped institute a number of measures to improve public safety and reduce losses from future natural disasters. Major efforts are listed below:

- **Flood warning.** Flood warnings are closely coordinated with the City of Austin and LCRA and are generally issued through public media. The City maintains a Flood Early Warning System (FEWS) for some watersheds (see Section 5.2.1). Warnings for Onion Creek are problematic because most of the watershed is in Hays County and the only USGS stream gauge washed away; so very little data are

available. LCRA warns the County about 6 hours before opening gates on Lake Travis/Mansfield Dam.

- **Dam safety.** LCRA has an extensive dam safety program, which includes inspections, maintenance, and repair of dams owned by LCRA. Issuance of warnings is coordinated with OEM.
- **Wildfire.** Wildfire has been a problem, usually requiring OEM to coordinate with other jurisdictions and the Emergency Service Districts.
- **Winter storms.** Ice from winter storms can cause problems for up to three days, although most incidents last under 48 hours. The state has an ice response plan to address major roads.
- **Hazardous materials.** The County's Local Emergency Preparedness Committee (LEPC) is federally mandated. It meets every two months, primarily focusing on public awareness and hazardous materials. Most reported hazardous materials fixed sites (handlers, storage) are located in the City of Austin. Hazardous materials are addressed in Annex Q of the County's Emergency Operations Plan. Of primary concern are transport incidents and the presence of stored chlorine at the 95 water treatment companies throughout the County, some of which are likely to be in floodplain areas. OEM reports no HazMat incidences related to flooding.
- **Tornados.** Through a partnership with the "Disaster Ready Austin" initiative and a matching grant from J. P. Morgan, NOAA Weather/All Hazard alert radios have been provided to all schools in the Austin Independent School District. One partner provided 60 radios for smaller public school districts in Travis County.
- **Civil unrest.** The EOC has been activated for civil unrest in the past.
- **Technological/terrorism.** Travis County OEM has participated in U.S. Department of Justice training exercises for responding to technological threats from terrorism, and is now seeking funding for training and equipment. Possible attack targets include landmark buildings, bridges, freeways, airports, utilities, dams, and industrial plants in the Austin area in particular. Dams, pipelines, water treatment facilities, sewer treatment facilities, and other public facilities also are potential targets. Therefore, specific data on these public facilities are not made available to the public.

In 1999, Texas A&M University, coordinating with the American Red Cross, conducted an evaluation of five Red Cross shelters in Travis County. The purpose of this evaluation was to determine suitability for use as hurricane shelters. All five were determined to be located outside of mapped flood hazard areas and all met wind resistance standards.



Facilities Management. Facilities Management coordinates the construction of new County facilities, implements and monitors how those facilities are used, and coordinates the maintenance and renovation of the facilities. The department's Risk Management office manages property insurance on County facilities. The County's property insurance coverage for buildings and improvements has a \$500,000 deductible. Covered losses include those associated with natural hazards, such as wind and lightning.

Individual flood insurance policies are not maintained on County facilities located in flood hazard areas, although flood damage has been sustained by these facilities on a number of occasions. It is notable that most damaged facilities have been park and recreational facilities, some of which are not insurable under the NFIP because they do not qualify as insurable structures (which must be walled and roofed).

County Budget Process. Travis County is limited by law to developing a one-year budget. Therefore, the County does not maintain a multi-year, capital improvement plan or program. As needed, generally every 4-5 years, the Commissioners Court calls for capital improvement proposals from the County's departments, such as the construction of park facilities or major road improvements. Citizens Bond Advisory Committees are created, the departments develop detailed proposals, public hearings are held to discuss the needed works, and bond elections are held.

Agricultural Cooperative Extension. The Agricultural Cooperative Extension is a partnership supported by state (60%) and federal (10%) funding. It serves everyone in Travis County and incorporated cities through educational programs in the areas of family and consumer sciences, agriculture, horticulture, natural resources, 4-H, and youth programs. With its limited resources, the Extension focuses on assisting and educating the public on a variety of questions and issues, especially those related to horticulture, agriculture, water quality (excluding onsite septic systems), erosion, wildlife concerns (e.g., chronic wasting disease), and tree maintenance (e.g., trimming trees damaged by ice). In 2002, the Extension addressed considerable public concern over West Nile virus.

The Extension generates public awareness via news releases to newspapers, radio, and television. Expansion of the Web site is also planned (www.travis-co.tamu.edu). Some information related to flooding is available on the site, primarily about mosquito and fire ant control, and recommendations for drying to minimize mold problems. As far as existing public awareness of flood hazards, farmers themselves view flooding as a normal part of the hydrologic cycle and so do not turn to the Extension for recovery advice.

The Texas Cooperative Extension of the Texas A&M University System posts some flood information on its Family and Consumer Sciences Web site (www.fcs.tamu.edu). Nearly 40 flood-related topics are available related to preparation, food and health, household cleanup and repair, insurance, and stress. Some materials offered on the Web site are available in Spanish.

Significant flood damage to agricultural buildings was not reported during recent flood events.

Agricultural Uses in Floodplains

- *County regulations do not restrict uses if performed according to standards of the Soil Conservation District.*
- *Agricultural uses include stock ponds, terraces, dikes, ditches and soil conservation measures.*

6.3 Continued Compliance with the NFIP

To participate in the National Flood Insurance Program, a local jurisdiction adopts an ordinance or regulations to regulate development within flood hazard areas. The ordinance must be consistent with the minimum federal requirements of the NFIP (44 CFR 60.3). The processes for administration, including enforcement, must support effective compliance with the minimum requirements.

Travis County satisfied requirements for initial participation in the NFIP and joined the Emergency Program on January 22, 1976. By adoption of



Chapter 64, Regulations for Floodplain Management and Guidelines and Procedures for Development Permits, on March 29, 1982, Travis County satisfied the requirements of the NFIP's Regular Program. The effective Flood Insurance Rate Map for Travis County was adopted and is now used as the minimum flood hazard area within which development must conform to floodplain management regulations. To date, neither FEMA nor TCEQ have conducted a Community Assistance Visit (CAV) in Travis County. Because of the number of repetitive loss properties, Travis County is classified as a repetitive loss community.

Incorporated municipalities within Travis County also participate in the NFIP, having joined the Regular Program at different times (noted below in parentheses) since 1978:

- City of Austin (1981)
- Village of Bee Cave (1988)
- Village of Briarcliff (1983)
- City of Jonestown (1982)
- City of Lago Vista (1982)
- Village of Lakeway (1980)
- City of Manor (1978)
- City of Mustang Ridge (2000)
- City of Pflugerville (1978)
- City of Rollingwood (1978)
- Village of San Leanna (1980)
- City of Sunset Valley (1979)
- City of West Lake Hills (1978)

A review of the County's floodplain regulations and subdivision standards (Travis County Code, Chapter 64 and Chapter 82) was prepared to determine consistency with the NFIP. The review is on file with the Transportation & Natural Resources Department. It was performed to ensure continued compliance with the NFIP and to identify opportunities to clarify regulatory language. The findings suggest the following:

- There is an indistinct separation of provisions related to process and procedures on the one hand, and the specific, performance-based provisions that pertain to activities affecting drainage and floodplains on the other hand.
- Handling of "unnumbered A zones" (base flood elevations unspecified) is not clearly outlined, and floodway requirements are not clearly identified.
- Emphasis on floodproofing appears to downplay elevation; a document referenced for floodproofing is out of date.
- Substantial improvements (including additions) and substantial damage should be clearly addressed.

The Community Rating System. The review of the floodplain regulations also served to identify measures adopted by Travis County that may qualify for credit under the NFIP's Community Rating System (CRS), should the County pursue this initiative. The CRS is intended to recognize and encourage management of flood hazard areas above the minimum requirements of the NFIP. The CRS offers discounts on the cost of federal flood insurance to those citizens who reside within recognized communities. Travis County is not a participant in the CRS, and consideration of such participation involves a careful balancing of many factors. Significantly, while the savings accrue to citizens, the County would likely incur certain additional costs.

Nationwide, the average NFIP premium for \$100,000 in coverage on an A Zone property is on the order of \$500. Thus, in communities with a 5% discount, policyholders see, on average, annual savings of \$25 (the average B, C, and X Zone policy is \$150, with policyholder savings of \$7.50 per year).

Estimates of cost savings due to the NFIP 5% discount can be calculated for actual policyholders as well as for all buildings in the floodplain. As of December 2001, the NFIP reports that 1,248 flood insurance policies are in force in Travis County, although a breakdown by flood zone is not available. Assuming the average cost of a policy is \$500, a 5% discount would yield total savings for property owners of about \$29,500 each year. As described in Section 5.4, approximately 6,800 buildings are located in all of the County's floodplains; thus, if all were insured, a 5% discount would mean that citizens collectively would save approximately \$170,000 each year.

An independent report identifying possible points based on the County's current program, as well as a number of reasonable and feasible additional activities that may qualify for CRS points, is on file with the Transportation & Natural Resources Department.



6.4 Ongoing and Previous Mitigation Initiatives

Dealing with flood hazards, the most significant natural hazard in Travis County, is not a new proposition for the County, which has experienced numerous flooding events in its history. The County has undertaken a number of cooperative efforts, studies, and projects to address flood hazards. Foremost among these efforts is the County's participation, since 1976, in the NFIP.

6.4.1 Lower Colorado River Authority

The Lower Colorado River Authority (LCRA) is a conservation and reclamation district created by the Texas Legislature in 1934. It relies solely on utility revenues and fees generated from supplying energy, water, and community services. LCRA supplies low-cost electricity to Central Texas, manages water supplies and floods in the lower Colorado River basin, develops water and wastewater utilities, provides public parks, and supports community and economic development in 58 Texas counties.

LCRA's activities are numerous. Specifically, it manages water supplies for cities, farms, and industries along a 600-mile stretch of the Texas Colorado River between San Saba and the Gulf Coast. Six of its dams on the Colorado River create the scenic Highland Lakes – Lakes Buchanan, Inks, LBJ, Marble Falls, Travis, and Lake Austin. Water is sold to municipal, agricultural, and industrial users, and discharges are regulated to manage floods.

LCRA helps communities plan and coordinate water and wastewater needs, operates an environmental laboratory, and monitors the water quality of the lower Colorado River. Additionally, it enforces ordinances to control illegal dumps, regulates onsite sewage systems, and institutes measures to reduce the impact of major new construction along and near the Highland Lakes. This last responsibility includes coordinating development around Lake Travis.

LCRA owns about 16,000 acres of park and recreational lands along the Highland Lakes and Colorado River. It encourages the use and expansion of these recreational lands through "Partnerships in Parks", which

supports local efforts to improve park facilities throughout the region. More than 40 parks, environmental learning centers, and nature preserves are contained within the LCRA parkland.

A partner in the Texas Colorado River Floodplain Coalition (Section 6.4.4), LCRA is working with the County and the U.S. Army Corps of Engineers to update of the Lower Colorado River Flood Study (in process as of early 2003).

6.4.2 U.S. Army Corps of Engineers' Studies

The U.S. Army Corps of Engineers participates in and undertakes a wide variety of projects, including studies of large river systems such as the Lower Colorado River and smaller watersheds such as Onion Creek in the City of Austin and Travis County.

Lower Colorado River Study. This multi-year effort is designed to improve knowledge about flooding throughout the Lower Colorado River Basin and to identify ways to reduce property damage and loss of life during major floods. On Lake Travis, preliminary results of the study indicate a 100-year flood level that is approximately 6 feet higher than previously determined.

In the next step of this multi-year study, the Corps will evaluate potential economic and environmental damages due to flooding. Subsequent phases, expected to take several years, will examine mitigation alternatives to reduce the risk or magnitude of damages. Periodic updates on the Lower Colorado River Study are posted as Fact Sheets on the Texas Colorado River Floodplain Coalition Web site at www.tcrfc.org.



Colorado River Flood Risk

LCRA reports a total of 15,774 structures in the currently effective mapped 100-year floodplain from Lake Buchanan down to Matagorda County. Travis County and the City of Austin account for 22% of the total:

- *2,698 are around Lake Travis (based on preliminary study of the revised flood elevation), and*
- *759 are along the River below Lake Travis.*

Onion Creek Study. The Corps is revising a study of flood damage along Onion Creek, a sub-basin of the larger Lower Colorado River study. A total of six damage centers are being examined, with four located in the County – Timber Creek, Onion Golf, Arroyo Doble, and Bluff Springs. For the analysis, the Corps is developing depth-damage curves that will also be useful for estimating flood damage in other areas. The Corps held a public meeting about the study on September 25, 2002, presenting potential solutions and encouraging the public to ask questions. A limited number of mitigation alternatives, selected in consultation with the County, will be examined in a subsequent phase of the study. In 2002, on behalf of the County, the City of Austin, and the City of Sunset Valley, the Texas Colorado River Floodplain Coalition applied for funding from the Texas Water Development Board to support the study. Results from the study are expected in 2004.

6.4.3 Texas Colorado River Floodplain Coalition

The Texas Colorado River Floodplain Coalition is a partnership of cities and counties (including Travis County) in the Colorado River basin seeking better ways to reduce and mitigate flood damage. It was formed in response to a combination of rapid growth, a greatly expanded number of buildings in the floodplain, and recurring significant floods in recent years. The Coalition is organization around a number of regional and technical working committees. A Stakeholder Advisory Group was formed to solicit and provide public comment on Coalition initiatives. LCRA provides administrative and technical support to the Coalition.

The goals and objectives, as well as some recent activities (noted in parentheses), of the Coalition include:

- Provide improved and updated flood insurance maps and risk information (a FEMA grant supports starting this initiative; additional funding is being sought over 5 years);
- Enhance training for floodplain administrators and elected officials;
- Offer program coordination, information sharing, and technical assistance (obtained FEMA funding to work with communities to develop mitigation plans);
- Encourage effective and consistent building requirements to address cumulative impacts;
- Identify and implement cost-effective alternatives to structural controls that also provide recreational and environmental benefits; and
- Become a one-stop clearinghouse for information and resource material relevant to floodplain management and emergency response (supported passage of SB 938 to enhance authority, funding, and enforcement of floodplain requirements).

6.4.4 Timber Creek Floodplain Acquisition

In September 1997, the City of Austin finalized the Flood Control Study for the City of Austin Drainage Utility using modeling developed by the U.S. Army Corps of Engineers. The study examined existing flood threats and mitigation options for neighborhoods along Onion Creek and upstream of the Roy Kizer Golf Course. The study defined the magnitude of flood conditions in Onion Creek Forest, Onion Creek Plantations, and Yarabee Bend subdivisions. Further, it assessed a range of structural and nonstructural options to mitigate flood losses. Structural options investigated included channel modification, levee construction, flood detention, raising buildings on higher foundations, and two flow diversion scenarios. Nonstructural options included purchase and removal of buildings from the floodplain. Benefits and costs of these mitigation options are summarized in the report generated from the study.

Prompted by significant flooding in 1998, which resulted in Presidential Declaration DR 1257, and based in part on the results of the City's study, Travis County initiated acquisitions of flood-damaged homes in the neighborhood of Timber Creek. Seventy-five percent of the funds to



purchase these properties have been provide through FEMA and the State of Texas Hazard Mitigation Grant program, administered by the Texas Division of Emergency Management. Travis County applied for HMGP funding following Presidential Disaster Declaration DR 1257 and funds from a National Unmet Needs allocation. As of 2002, Travis County has received grants from FEMA and the state totaling over \$2.8 million for the purchase of 46 homes.

With an average pre-flood value of over \$50,000 and an estimate of \$20,000 per home in contents value, the permanent removal of these homes from harms way has resulted in the mitigation of significant future potential damages. Using FEMA's limited data model it is estimated that the expected avoided future damages are \$3.2 million. The homes in this buyout are deep in the floodplain and have flooded on average from 5-year frequency events. The building damage has been on the order of \$20,000 per home, per event; contents damage has average \$5,000 per home.

In November 2001, a significant number of additional homes in Timber Creek were substantially damaged as a result of Onion Creek flooding. However, a Presidential Disaster Declaration was not made and additional assistance funds were not made available. Travis County is evaluating various grant programs that may provide funds to assist in the potential acquisition of some of these flood-damaged homes.

6.4.5 Texas Water Development Board

In 2002, Travis County received a Flood Mitigation Assistance Planning Grant in the amount of \$30,000 to assist with the development of the flood-related portion of this Mitigation Plan. The grant and the assistance of the Texas Water Development Board were critical to the successful completion of this plan.

6.4.6 Other Federal Funding

As of mid-2003, Travis County had not received funding from three of FEMA's programs: Project Impact; Pre-Disaster Mitigation program; or the annual Property Protection-Mitigation program.

6.5 Public Private Partnerships

Disaster Ready Austin is helping the Austin area become a “disaster-resistant” community. The goal is to get everyone – from individuals on up to the entire community – to take preventive measures before the next disaster strikes. FEMA estimates that for every dollar spent in damage prevention, two dollars are saved by avoiding future repairs. Travis County is a partner in Disaster Ready Austin.

Disaster Ready Austin is supported by private and public sector partners who generously donate services, goods, and their valuable time.

In 2003, the initiative is seeking volunteers to present public education sessions, to answer the disaster help line, and to support preparation of damage estimates after disasters.

Flood hazards. A number of initiatives have been undertaken by Disaster Ready Austin, or are planned for 2003:

- The Web page (www.ci.austin.tx.us/disasterready) helps citizens determine who is at risk, how to prepare, what to do if flooding occurs, and how to clean up. Simple and low-cost mitigation measures are highlighted, including raising electric panels, elevating utilities on platforms, anchoring fuel tanks, and installing backflow valves in sewer lines.
- Capital Metro is donating exterior bus advertising space to promote the dangers of low water crossings. Driving into water is the number one weather-related cause of death in Central Texas. Many people died or had to be rescued after driving into floodwaters in the November 2001 floods.
- Capital Metro is donating interior bus advertisements to alert the public to the importance of flood insurance. “Everyone needs flood insurance” messages alert readers that homeowners and renters insurance do *not* cover flood losses.
- Flood Awareness Week (May 18–24, 2002) was highlighted by a swift water rescue demonstration and testimony by a citizen who described her harrowing experience and rescue from the November 2001 flood.



Tornado and lightning hazards. Initiatives include:

- Using partner donations, place NOAA Weather/All Hazard alert radios in all schools in the Austin Independent School District. One partner provided 60 radios for smaller public school districts in Travis County.
- Videos and coloring books on tornado and lightning safety were distributed to the Austin Independent School District schools.
- Participation in the national Lightning Safety Awareness Week (April 28–May 4, 2002) to teach lightning safety skills to millions of school children.

Wildfire hazards. In mid-2002, the Austin Fire Department began the field research phase of the Austin Area Wildland Interface Study, in cooperation with the County, other jurisdictions, and the Emergency Service Districts. Funded by FEMA, the study will help determine risk in high-hazard areas in West Austin where houses have been built within preserve areas or in undeveloped wildland. Tips for homeowners to identify risks and to prepare homes to mitigate wildfire risks are available online.

The managing partners of the Balcones Canyonlands Preserve and a number of private property owners coordinate under the umbrella of the Balcones Canyonlands Conservation Plan to participate in the wildland study. Private property owners include non-profit organizations such as the Travis Audubon Society and the Nature Conservancy of Texas.

6.6 Natural Resources

Travis County Development Services reviews permit applications to determine if applicants have contacted other regulatory authorities. Specifically, any proposed project within a wetland must have an approval from the U.S. Army Corps of Engineers, or a letter indicating that the Corps' approval is not required.

County subdivision standards contain a number of provisions pertinent to identification and protection of natural resources:

- §82.202(i) addresses drainage easements, which are defined to contain the 100-year storm event. Drainage easements are required along drainageways and must be a minimum of 25 feet wide for open

channels and 15 feet wide for closed storm drain systems. Notes on plats are required to state that drainage easements within lot boundaries are to be kept clear of fences, buildings, landscaping, and other obstructions. If an area is mapped on the Flood Insurance Rate Map as a special flood hazard area, it is within a drainage easement.

- §82.203(b)(10) requires developments that must submit a preliminary plan to show on the plan the location of trees that are 6 inches or greater in diameter, as defined in the *City of Austin Environmental Criteria Manual*, if the trees are proposed to remain within the right-of-way.
- §82.202 (b)(9)(E) anticipates the inclusion of “sites for special use (e.g., for parks, open space, detention or other public facilities)” in developments. Special-use sites may be required under certain circumstances, for example if the proposed development falls within an Extraterritorial Jurisdictional area with a municipality that requires open space, or to satisfy a specific performance requirement such as runoff control. Otherwise, developers often elect to incorporate open space as an amenity, especially if the proposed development is affected by a drainage easement.
- §82.207 specifies that subdividers provide for the parkland needs of residents by the dedication of suitable land for park and recreational purposes. Parkland or fees are dedicated or paid to the County (with certain exceptions and qualifications). Floodplain areas are accepted for parkland dedication.

Part 7

Mitigation Actions

7.1 Identifying Priority Actions

Throughout the planning process, the Mitigation Planning Committee discussed hazards, the number of people and types of property that are exposed, and the development review process. Based on a review of the background materials and the Committee's understanding, 15 potential actions were identified, circulated, reviewed, and prioritized. Of these 15 draft mitigation action items, one was eliminated as it was felt it was encompassed under another action; two were merged together, two were added; and several were slightly modified.

Factors that influenced prioritizing included the Committee's review of available information on flood hazards, other hazards, past hazard events, the number of people and types of property exposed to those hazards, and the elements of the development approval process. High priority was placed on those actions that are considered consistent with current County policies, those that are technically feasible and have high political and social acceptance, and those that can be achieved using existing authorities, budget levels, and staff.

Composites were made of the priorities indicated by each Committee member in the context of his or her agency's responsibilities. This analysis initially yielded eight high-priority actions and five medium-priority actions. Subsequent discussions resulted in moving one item up in priority.

7.2 Mitigation Actions

Table 7-1 identifies the link between mitigation actions and identified hazards. Tables 7-2 and 7-3 summarize each proposed mitigation action, indicating proposed lead office and support assignments, priority level, and timeframe. The proposed timeframes are consistent with the five-year review cycle required for this Plan. An updated version of this table will be included in periodic progress reports submitted to the Texas Division of Emergency Management and FEMA.

The following topic was discussed, but was dropped from further consideration as it has no specific action to be undertaken by the County: Texas Department of Housing and Community Affairs developed the State Low Income Housing Plan. A recommendation of that plan is to



“discourage the expenditure of State and federal housing funds in areas susceptible to repeated flood damage.” The Department can provide funds for the non-federal match required in FEMA’s mitigation grant programs.

Table 7-1
Linking Actions to Hazards.

Hazard	Probability of Occurrence*	Estimated Annual \$ Damage**	Action Item(s)
Floods	High	High	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 14, 15, 16, 17, 18
Winter Storm Hazards	Low	Low	1, 4, 5, 11, 12
High Wind Hazards/Tornadoes	High	High	1, 4, 5, 12, 13, 18,
Wildland Fire	Medium	Low	1, 3, 4, 5

* Based on Historical Occurrences as indicated in section 5

** Based on calculated estimate of annual damage

Less than \$250,000 annual estimate of damage = Low

Less than \$1,000,000 annual estimate of damage = Medium

Greater than \$1,000,000 annual estimate of damage = High

In Table 7-2, the focus is on high priority actions. For each action, the Committee identified the lead office, characterized anticipated support by elected officials and the community at-large, discussed funding limitations and status, and developed a qualitative statement regarding cost effectiveness. In this context, the cost of accomplishing the action was compared to the perceived benefits, including community-wide safety.

Medium priority actions (Table 7-3), scheduled for further consideration when the County undertakes the comprehensive review, are listed. Lead offices and other factors will be discussed and documented during the Plan revision. At that time, it is anticipated that new actions will be identified and a process to prioritize all actions will be undertaken.

7.3 Links to Mitigation Goal Statement

Travis County Mitigation Goal Statement

It is the goal of Travis County to protect public health, safety and welfare and to reduce losses due to hazards by identifying hazards, by minimizing exposure of citizens and property to hazards, and by increasing public awareness and involvement.

Table 7-4 shows how the proposed actions listed in Section 7.1 directly support the County's Mitigation Goal Statement. A number of actions individually support more than one element of the goal. **Note:** Mitigation action items pertain to both current and future development as well as infrastructure, as applicable, within unincorporated Travis County.

Table 7-2
High Priority Mitigation Actions.

Mitigation Actions & Notes on Implementation	
HIGH PRIORITY: Time Period (2003 – 2008)	
Action #1: Public Communications. Develop a communications plan to improve consistency and efficiency of dealing with the public before and after natural hazard events. Consider such elements as: <ul style="list-style-type: none">a. Expand County Web page; explore linking County Web page to other sources (City of Austin, Travis Conservation, Texas Cooperative Extension/TAMU, TX Forest Service).b. Prepare handouts for property owners and permit applicants; keep at permit counter.c. Develop brief presentation that can be made to local groups (homebuilders, realtors, neighborhood organizations, employers, etc.).d. Establish central phone number that County residents can call for information about post-disaster recovery, cleanup, mitigation, and permits.e. Plan to hold post-disaster public meeting (especially with permit materials and handouts for mitigation).f. Translate certain materials into Spanish.	
Lead Office	TNR and OEM
Support	Strong (encourages citizen awareness and participation in reducing damage).
Status & Funding Notes	Elements (a), (c), (e) and (f) can be under-taken within existing budget. Element (b) is completed. Element (d) requires additional funding.



Table 7-2
High Priority Mitigation Actions.

Mitigation Actions & Notes on Implementation	
Cost Effectiveness	Very cost effective
Action #2: Flood Warning. Increase predictive capability (e.g., stream gauges) on flooding sources with associated high-risk damage centers where there is currently little advanced warning: a. Examine feasibility of integrating with City/FEWS and/or LCRA/HydroMet. b. Identify Manufactured Home Parks (and other concentrations of pre-FIRM structures) that are in the SFHA and determine if modification of warning and evacuation procedures for these groups of dwellings is warranted.	
Lead Office	TNR and OEM
Support	Strong (protect lives).
Status & Funding Notes	Element (a) is not included in budget (2004); future budget request will be required for equipment. Element (b) can be done with existing resources
Cost Effectiveness	Very cost effective.
Action #3: Property Parcel Maps and Hazard Awareness. Support linking property parcel maps with tax database for multiple uses, including: a. For parcels with buildings, develop mailing list to contact building owners about permit requirements (substantial improvements, substantial damage, replacement Manufactured Home units); encourage flood insurance and mitigation measures. b. For undeveloped parcels, develop mailing list to alert owner of permit requirements and encourage development out of floodplain. c. For properties in the Balcones Canyonlands, identify and contact owners about mitigation measures (e.g., defensible space, fire-resistant materials). d. Assist with public safety operations.	
Lead Office	TNR
Support	Moderate (coordination with Travis Central Appraisal District).
Status & Funding Notes	Development of linkage: requires additional resources; not in FY04 budget, will pursue in future budget. Use of linked data for elements within current resource levels.
Cost Effectiveness	Cost effective.
Action #4. Mitigation Projects and Risk Assessment. Continue efforts to mitigate high-risk problem areas. Gather information on buildings in high-risk damage centers (for flood hazards, this would include repetitive loss areas) to have available post-event; use to target efforts for recovery, permitting, and grant application development: a. Develop Floodplain Buyout Policies and Procedures Manual. b. Share information with Emergency Service Districts that go neighborhood to neighborhood to encourage evacuation. c. Take photographs to document "existing conditions." d. Task survey crew to collect ground and floor elevations (can prepare Elevation Certificates, which may help encourage purchase of flood insurance). e. Encourage purchase of flood insurance to increase options for post-flood buyout/elevation. f. Maintain awareness of different sources of mitigation funding (pre-disaster, post-disaster, HUD, ORCA/HOME, ICC claims, etc). g. Continue to seek mitigation grant funds to implement high priority actions.	
Lead Office	TNR
Support	Strong

Table 7-2
High Priority Mitigation Actions.

Mitigation Actions & Notes on Implementation	
Status & Funding Notes	Seek funds to implement elements (a) – (c); otherwise work within existing budget to extent feasible. County cost-share will be required in future budgets if federal grant funds are obtained for projects.
Cost Effectiveness	Activities to identify and prepare for future flood mitigation projects are cost effective. Projects identified for future grant funds must be determined to be cost effective to be eligible for funding.
Action #5: Public Private Partnership. Continue participation in and support of Disaster Ready Austin and the Texas Colorado River Floodplain Coalition.	
Lead Office	TNR and OEM
Support	Strong
Status & Funding Notes	Ongoing activity.
Cost Effectiveness	Cost effective.
Action #6: Floodplain Regulations Review. Review floodplain and subdivision regulations and develop recommended revisions and clarifications to facilitate administration and public understanding.	
Lead Office	TNR
Support	Moderate
Status & Funding Notes	Ongoing compliance with HB 1445. Evaluation of regulations has been prepared. May require additional funding in future budgets.
Cost Effectiveness	Cost effective
Action #7: Dam Safety. For high and significant hazard dams located in the County or on waterways that drain through the County, determine if an Emergency Action Plan (EAP) has been prepared for each dam and coordinate with owners/operators to encourage EAP development. [Note: The National Inventory of Dams was used to identify these dams.]	
Lead Office	OEM
Support	Moderate
Status & Funding Notes	Facilities identified; within existing budget.
Cost Effectiveness	Cost effective
Action #8: Road & Bridge Safety. Review flood history and vulnerability of top flood-prone roads and bridges. Communicate priorities and concerns to the appropriate Agency (County or TXDOT). Request that safety be factored into upgrade review.	
Lead Office	TNR
Support	Strong
Status & Funding Notes	Ongoing
Cost Effectiveness	Cost effective
Mitigation Actions & Notes on Implementation	
HIGH PRIORITY: Time Period (2003 – 2008)	



Table 7-2
High Priority Mitigation Actions.

Mitigation Actions & Notes on Implementation	
Action #9: Acquisition/Demolition of flood prone homes in Timber Creek Subdivision. Timber Creek consists of mostly mobile homes deep in the floodplain. Most homes in this subdivision have experienced repetitive losses – to include many that were substantially damaged in an undeclared event, November 2001. However, there was not a Presidential Disaster declaration following this flooding and Travis County did not submit an application to the State of Texas DEM for acquisition of these homes. Travis County views mitigating flood damage in Timber Creek a priority and wants to take every opportunity to seek funds to assist in this endeavor. Submit at PDM application to acquire and demolish flood prone homes in the Timber Creek subdivision. If PDM is unsuccessful, continue to seek other sources of funding to acquire and demolish these flood prone homes.	
Lead Office	TNR
Support	Strong
Status & Funding Notes	Travis County has the 25% local match set aside in its current budget. Execution of the project is contingent upon grant award for the remaining 75%.
Cost Effectiveness	Cost effective – B/C analysis has been complete with a result of above 1.0.
Action #10: Acquisition/Demolition of flood prone homes in Grave Yard Point. Grave Yard Point lies along Lake Travis. Low lying homes in this neighborhood have experienced multiple flood losses. Travis County views mitigating flood damage in Grave Yard Point a priority and wants to take every opportunity to seek funds to assist in this endeavor. Travis County was recently awarded a FMA grant to acquire and demolish several homes on FEMA's repetitive loss list. This action is to execute the acquisition and demolish of the homes approved under this grant program.	
Lead Office	TNR
Support	Strong
Status & Funding Notes	Travis County has the 25% local match set aside in its current budget. The contracts between TWDB and Travis County for this grant are in process and the program should be able to begin in early 2005.
Cost Effectiveness	Cost effective – B/C analysis has been complete with a result of above 1.0.
HIGH PRIORITY: Time Period (2003 – 2008)	
Action #11: Provide community outreach and education to individuals and businesses concerning winter storm alerts and preparatory actions for homes and businesses. This is an only effort as part of Disaster Ready Austin education and outreach initiative. Through Travis County's continued participation with Disaster Ready Austin, we will work to ensure the effort reaches the unincorporated areas of Travis County. As part of the Disaster Ready Austin initiative, prior to and during severe winter storm season, citizens should be informed about: <ul style="list-style-type: none"> • Location of emergency shelters that may be opened as needed; • Preparations to wait out a winter storm at home, including advice on staying warm in an unheated house; • Guidance on the use of portable and standby generators; • Preparation for winter travel and tips for driving in bad weather; • Winterizing homes and businesses; • Fire hazards of space heaters; • Protecting plumbing during a winter storm; and, • Coping with winter power failures. 	
Lead Office	OEM
Support	Strong

Table 7-2
High Priority Mitigation Actions.

Mitigation Actions & Notes on Implementation	
Status & Funding Notes	Costs for this effort are part of Disaster Ready Austin education and outreach initiative. Travis County will continue to coordinate with Disaster Ready Austin to ensure the initiative reaches citizens within unincorporated Travis County.
Cost Effectiveness	Cost effective
Action #12: Conduct major tree pruning initiative along power lines. Travis County will work closely with local energy companies to develop a realistic schedule for tree pruning along electrical power lines.	
Lead Office	Local Energy Companies
Support	Strong
Status & Funding Notes	As this initiative is out of the control and responsibility of Travis County, implementation is dependent on local power companies' budget and schedule.
Cost Effectiveness	Cost effective
Action #13: Encourage the building of tornado safe community shelters. In 1999, Texas A&M University, coordinating with the American Red Cross, conducted an evaluation of five Red Cross shelters in Travis County. The purpose of this evaluation was to determine suitability for use as hurricane shelters. All five were determined to meet wind resistance standards as related to hurricanes but the evaluation did not include use as tornado shelters. Work with Red Cross and a registered Engineer to designate a tornado safe area in existing facilities. Encourage the installation of a tornado safe room in new public facilities or designated shelters.	
Lead Office	OEM/Red Cross
Support	Medium
Status & Funding Notes	Travis County currently has no budget for this initiative and the initiative is mostly out of the control and responsibility of Travis County. Implementation is dependent on Red Cross budget.
Cost Effectiveness	Cost effective

Table 7-3
Medium Priority Mitigation Actions.

Mitigation Actions & Notes on Implementation MEDIUM PRIORITY: Time Period (2008+)
Action #14: Environmental Safety. For the following types of facilities, inform owners/operators that they have been determined to be in or near mapped floodplains and encourage planning and protective measures: a. Water companies (reactive materials). b. Hazardous materials handlers with reportable quantities.
Action #15: NFIP Community Rating System. Evaluate benefits and costs of joining the NFIP's Community Rating System, which credits the County for sound floodplain management practices that exceed federal minimum requirements. Property owners may receive discounts on flood insurance premiums.



Table 7-3
Medium Priority Mitigation Actions.

Mitigation Actions & Notes on Implementation MEDIUM PRIORITY: Time Period (2008+)
Action #16: At-Risk Public Buildings. a. For County-owned NFIP-insurable buildings ("walled and roofed" only) determined to be in a mapped floodplain, examine flood hazard and risk factors to determine if flood insurance policies are appropriate and if mitigation measures are feasible. Share hazard information with other public entities (fire stations, water companies, schools, etc.) and encourage evaluation of at-risk buildings (depth, frequency, potential damage) and examination of options to minimize exposure, including flood insurance.
Action #17: Elevation Mark Database. Develop comprehensive database of benchmarks, reference marks, and elevation monuments (as specified in subdivision standards); publicize database and make it available to surveyors to facilitate their preparation of Elevation Certificates, required for flood insurance.
Action #18: Manufactured Housing Installation. Improve understanding of contractors and manufactured home installers of wind/tie-down installation and floodplain requirements by requesting that the State Department of Housing and Community Affairs (DHCA) send specific information to all contractors and installers in its annual mailing. Request cooperation of other interested local jurisdictions through the Texas Floodplain Management Association.

Table 7-4
Linking Mitigation Goals & Actions.

Element of Goal Statement	Actions Relating to Goal
Protect public health, safety and welfare	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 18
Reduce losses due to hazards by identifying hazards, by minimizing exposure of citizens and property to hazards	2, 3, 4, 6, 8, 9, 10, 11, 12, 14, 16, 17, 18
Increase public awareness and involvement	1, 2, 3, 5, 16

Part 8 Texas Agencies, Organizations & FEMA Programs

8.1 Overview

Mitigation of flood hazards traces its roots to Congressional deliberations about how to address continued and repetitive flood disasters throughout the first half of the 20th Century. The National Flood Insurance Program, authorized in 1968, prompted state and local government actions primarily intended to recognize and account for flood hazards in decisions on local development. It was not until 1988 that the concept of mitigation planning was articulated in a statute, known as “Section 409” planning. In 2000, the statute was revised under the Disaster Mitigation Act of 2000.

At the federal level the Federal Emergency Management Agency administers mitigation programs that foster planning and project implementation to address existing risks. At the state and regional levels, several agencies and organizations sponsor programs that bear on hazard mitigation. The following sections provide an overview of existing Texas agencies, organizations, and programs addressing hazard mitigation.

8.2 Texas Division of Emergency Management

The Texas Division of Emergency Management (DEM) (www.txdps.state.tx.us/dem) is designated by the Governor as the state’s coordinating agency for disaster preparedness, emergency response, and disaster recovery assistance. DEM is also asked with coordinating the state’s natural disaster mitigation initiatives, chairing the State Hazard Mitigation Team, and maintaining the State of Texas Emergency Management Plan. DEM fosters local mitigation planning and administers Hazard Mitigation Grant Program funds provided through the Federal Emergency Management Agency.

8.3 Texas Water Development Board

The Texas Water Development Board (TWDB; www.twdb.state.tx.us) administers a variety of programs related to water. The TWDB is the agency charged with statewide water planning and administration of financial assistance programs for the planning, design, and construction of water supply, wastewater treatment, flood control, and agricultural water conservation projects. TWDB administers funding from FEMA under the Flood Mitigation Assistance Program (see Section 8.8).



8.4 Texas Commission on Environmental Quality

The Texas Commission on Environmental Quality (TCEQ; www.tceq.state.tx.us) is a diversified agency dealing with permitting, licensing, compliance, enforcement, pollution prevention, and educational programs related to preservation and protection of air and water quality and the safe disposal of waste. Related to mitigation of natural hazards are TCEQ programs that deal with drought, dam safety, and flood control and floodplain management.

TCEQ is designated by the Governor as the State Coordinating Agency for the National Flood Insurance Program. In this capacity, the agency assists communities with floodplain mapping matters and interpretation and enforcement of local floodplain management regulations.

8.5 Lower Colorado River Authority

Created by the Texas Legislature in 1934, the Lower Colorado River Authority (LCRA; www.lcra.org) is a conservation and reclamation district created to improve the quality of life in Central Texas and serves all or parts of 58 counties. Through a system of dams, LCRA supplies electricity to more than a million Texans. It also serves numerous water customers, including cities, the rice-growing industry, and municipal utility districts. Other LCRA services include managing floods, protecting the quality of the lower Colorado and its tributaries, providing parks and recreational facilities, offering economic development assistance, helping water and wastewater utilities, and providing soil, energy, and water conservation programs.

LCRA manages Marshall Ford Dam (also known as Mansfield Dam), which impounds Lake Travis. One of the primary purposes of the dam is to manage flood flows to minimize downstream flood damage. Below are statistics describing salient flood-related characteristics of Lake Travis:

- At its average pool elevation, Lake Travis has a surface area of approximately 43,085 acres (67 square miles).
- The water level of Lake Travis fluctuates around its average pool elevation of 669 feet above datum (NGVD 1929), at times dramatically.

-
- The Base Flood Elevation for Lake Travis, as shown on the Flood Insurance Rate Map, is 716 feet above datum (47 feet above average).
 - Historical low water occurred in August 1951, when pool elevation fell to 614.18 feet above datum.
 - Maximum pool elevation for Lake Travis occurred in December 1991, when it reached 710 feet above datum.
 - In general, when operated to manage major flood flows, the Lake level remains high for at least two months, sometime as long as three.
 - Approximately 2,025 buildings are within the mapped special flood hazard area around Lake Travis (land below elevation 716 feet).

8.6 Texas Colorado River Floodplain Coalition

The Texas Colorado River Floodplain Coalition (www.tcrfc.org) is a partnership of cities and counties in the Colorado River basin seeking better ways to reduce and mitigate flood damage. Established by the Texas Legislature by resolution in 2001, it was formed in response to a combination of rapid growth, significant increases in the number of flood-prone homes and businesses, and devastating floods throughout the basin.

The mission statement of the Coalition reflects the cooperative spirit of the partnership:

“Encourage comprehensive, consistent management of the floodplain along the Colorado River and its tributaries; provide a forum for data exchange; and facilitate a structured approach to managing the complex issues related to floodplain management.”

A series of Coalition objectives are set forth under four categories: technical, emergency management, training, and legislative/legal/funding. An early initiative undertook an “independent review” of the floodplain management programs of Coalition partner communities. The Lower Colorado River Authority provides administrative and technical support to the Coalition.

8.7 FEMA National Flood Insurance Program

In 1968, Congress authorized FEMA’s National Flood Insurance Program (NFIP) for two primary purposes: (1) to have flood-prone property owners contribute to their own recovery from flood damage through an insurance program; and (2) to guide development such that it is less prone



to flood damage. To facilitate implementation, the NFIP created Flood Insurance Rate Maps (FIRMs) that, based on best available information and engineering methodologies, show areas subject to flooding by the 1-percent-annual chance flood (also called the “100-year flood”). Communities use the maps to guide and regulate development. Citizens and insurance professionals use the maps to determine insurance needs.

It is notable that, whereas flood insurance claims are paid when damage is sustained from any qualifying flood event, federal disaster assistance is available only after a flood is determined to be a “major disaster.” A major disaster exceeds state and local capabilities. In addition, disaster grants to individuals and families are limited to approximately \$14,000. Therefore, owners of insured buildings that are in areas known to flood, especially as shown on FIRMs, are protected financially as long as they carry sufficient flood insurance coverage. Additional information on flood insurance coverage for property owners and consumers is available online at www.fema.gov/nfip.

Basic federal flood insurance helps pay for property damage and loss of contents. Under certain circumstances – for example, if flood damage causes “substantial damage” – an additional mitigation claim payment is available to help owners bring buildings into compliance with NFIP flood protection standards. Compliance is required with a building is substantially improved (includes repair of substantial damage). Substantial improvement is defined as improvements valued at 50% or more of the building’s market value before improvement.

Flood Insurance in Texas (as of 12/2001)

With 431,388 NFIP policies in force (nearly 10% of all policies nationwide), Texas ranks second among all states in number of flood-insured properties (Florida is #1).

Property owners in Texas have received over 122,000 claim payments totaling \$2.37 billion; only Louisiana has had more claims paid.

Source: NFIP Statistics online at www.fema.gov/nfip

8.8 FEMA Mitigation Grant Programs

In 1988, Congress authorized the first grant program intended to help local jurisdictions and states mitigate the effects of natural hazards. From time to time, additional funds have been authorized by Congress, although generally they are intended to achieve similar purposes and are administered in the same manner.

Pre-Disaster Mitigation Program (PDM)

Authorized by the Disaster Mitigation Act of 2000, Pre-Disaster Mitigation grant program funds are expected to be appropriated each year to support a grant program that is funded regardless of disaster experience. As of mid-2003, the regulations for the program were not promulgated, although they are expected to be similar in most respects to the Hazard Mitigation Grant Program (below). The most significant difference will be that the funds made available will not be allocated by state immediately after a disaster, but awarded on a nationwide, competitive basis.

Hazard Mitigation Grant Program (HMGP)

First authorized in 1988, the Hazard Mitigation Grant Program (HMGP) funds become available after major disasters. The amount of funding is determined as a percentage of certain types of federal assistance (e.g., emergency support, assistance to repair public infrastructures, and



assistance to individuals and families). HMGP provides up to 75% of eligible costs, the remaining 25% must come from other, approved sources that may include, including in-kind and property owner contributions. Eligible grantees include local jurisdictions and certain private non-profit organizations.

Eligible projects must solve a given hazard problem, be cost effective, conform with environmental regulations, meet all applicable codes and standards, and be supported by state and local mitigation plans. For the most part, HMGP funds have been used by local jurisdictions to address flood hazards, primarily through acquisition of flood-prone houses and land. Other eligible projects have included elevation-in-place of flood-prone houses, floodproofing of public infrastructure, floodproofing of non-residential buildings, and drainage improvements.

Flood Mitigation Assistance Program (FMA)

Specifically authorized by Congress in 1994 to fund projects that are “in the best interests of the NFIP,” the Flood Mitigation Assistance Program (FMA) is funded each year by Congress, regardless of disaster declarations. Funds are available to support planning, technical assistance, and projects. In recent years, considerable focus has been on projects that address properties known as “repetitive loss properties.” These are properties that have received two or more flood insurance claim payments above a certain value. States receive an annual share of funds from FMA that can be used for acquisition/demolition of flood-prone buildings; elevation-in-place, relocation, or floodproofing of structures (including public structures); and minor flood control projects that do not duplicate activities of other federal agencies.

9.1 Distribution

The Travis County *Hazard Mitigation Plan* will be posted on the County's Web site, and notices of its availability will be distributed to the following:

- The federal and state agencies that were notified and invited to participate in Plan development (see Sec. 1.3);
- The cities within the County;
- Citizens who attended public meetings and provided contact information; and
- The organizations, agencies, and elected officials who received notices of public meetings (see Appendix D).

9.2 Implementation

Through the mitigation planning process, the Travis County agencies that are involved in managing hazards and implementing measures to minimize future risk considered a range of mitigation actions. Actions were identified and prioritized, and are shown in Tables 7-2 and 7-3.

For each mitigation action, Tables 7-2 and 7-3 identify the lead agency, support agencies, priority level, and time period for implementation. Each lead agency is responsible for factoring the action into its work plan and schedule over the indicated time period. Annual reports on the status of implementation, including obstacles to progress, will be submitted by lead agencies to the Travis County Office of Emergency Management.

9.3 Monitoring & Progress Reports

Annually, on or near the anniversary date of FEMA's acceptance of this Mitigation Plan, TNR and OEM will convene a meeting of representatives from each department on the original planning committee to discuss and determine implementation accomplishments and/or implementation problems and recommended solutions.

As part of its responsibilities as described under Annex P of the Travis County Emergency Management Plan, the Travis County Office of Emergency Management is charged with monitoring and preparing progress reports. TNR and OEM will utilize the data obtained from the annual meeting to note progress made on the mitigation action items in annual progress reports and to record such progress in Appendix F. The



annual report will include the name, phone, fax, email address of the person(s) who conducted the review and the date that it was prepared and submitted to DEM.

In addition to the scheduled reports, OEM will convene meetings after damage-causing natural hazard events to review the effects of such events. Based on those effects, adjustments to the mitigation actions and priorities may be made, or additional event-specific actions may be identified. Adjustments will be reflected in revisions to the Plan, which shall be documented as outlined in Section 9.4.

9.4 Revisions

Revisions that warrant changing the text of this Plan or incorporating new information may be prompted by a number of circumstances, including identification of specific new mitigation projects, completion of several mitigation actions, or requirements for qualifying for specific funding. Minor revisions may be handled by addenda.

Major comprehensive review of and revisions to this Travis County *Hazard Mitigation Plan* will be considered on a five-year cycle. Adopted in 2003, the Plan will enter its next review cycle sometime in 2007, with adoption of revisions anticipated in 2008. The Mitigation Planning Committee will be convened to conduct the comprehensive evaluation and revision to include the identification and prioritization of additional mitigation action items, as required.

Travis County will involve the public in the plan maintenance process and during the major comprehensive review to the Plan in the same ways used during the original plan development. The public will be notified when the revision process is started and provided the opportunity to review and comment on changes to the plan and priority action items. It is expected that a combination of informational public meetings, surveys and questionnaires, draft documents posted on the web site, and public Commissioners Court meetings will be undertaken.

9.5 Incorporating Mitigation Plan Requirements into Other Local Planning Mechanisms

It should be noted that unincorporated Counties in Texas, such as Travis County, have very limited land use and zoning authority. As a result, Travis County has limited mechanisms available for local planning. Travis County's Office of Emergency Management and Transportation and Natural Resources Department do complete annual budgets and work plans. The annual budget and work plan development processes do incorporate mitigation plan requirements.

Appendix A

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Appendix B

Summary of Planning Committee Meetings

Mitigation Planning Committee Meeting #1 (July 16, 2002)

The Travis County Transportation & Natural Resources Department (TNR) was charged with leading the mitigation planning initiative. The Mitigation Planning Committee (Committee) is composed of members from appropriate agencies (list follows).

The Committee convened on July 16, 2002 for the first meeting to review and address the following:

1. What is mitigation planning and why the County is undertaking this task. It is understood that the Plan will further build on federal and State efforts to reduce the effects of natural hazards; a new federal-level planning requirement was briefly described by FEMA.
2. The planning process was outlined: identify hazards; identify what is at risk; evaluate current policies and procedures; evaluate what else can be done (or can be done differently).
3. Overview of common natural hazards: flood (from all sources, including hurricane, heavy rain, dam break), high wind, winter storms
4. Less common natural hazards: wild fires, earthquake (Travis County has low seismic risk).
5. Hazardous materials considered where location intersects with natural hazard (i.e., within flood hazard area).
6. Overview of disasters in the United States: occur in every state; nearly all jurisdictions have flood hazards; winter storms affect more people than floods; earthquakes are the most costly.
7. Uncounted costs of disasters: small events do not qualify for federal financial assistance; grants do not cover all costs; loan repayment costs far exceed insurance costs.
8. Define hazard identification & risk assessment: where do hazards occur, with what severity and frequency, and what is likely to be damaged.
9. Overview of the County's hazards:
 - a. Location specific: mapped floodplains; hazardous materials
 - b. Countywide: high wind; winter storm
10. Introduction of need for a mitigation goal; to be compatible with other County goals
11. Overview and examples of mitigation actions:
 - a. Programmatic and planning
 - b. Public infrastructure and buildings
 - c. Public information
 - d. Projects
12. Review steps in the mitigation planning process:
 - a. Field visit to damage/vulnerable locations
 - b. Interview each department
 - c. Discuss opportunities
 - d. Prioritize mitigation actions
 - e. Get public input (process is still to be determined)
 - f. Prepare, review and adopt plan
13. Comments by attendees:
14. Schedule:
 - Target is to complete the plan by December 31, 2002. This will require three more meetings for the FMA plan and two more for the Hazard Mitigation Plan. The next meeting will be preceded by in-depth interviews with representatives from each department and pertinent program.
 - Second meeting of the Committee – To be determined

Travis County Mitigation Planning Committee Membership

The following table lists the members of the Committee. They will participate in Committee meetings, gather and provide information to the consultant, review interim materials and drafts of the Plan, and evaluate potential mitigation actions in the context of their department's capabilities and responsibilities as well as the overall and long-term benefits of the County.



Name	Organization	Area of Responsibility	Phone	Email Address
Jeff Ward	Donald R. Ward & Assoc.	Consultant	(941) 514-1801	jeffreysward@earthlink.net
Don Ward	Donald R. Ward & Assoc.	Consultant	(941) 566-3230	dwardsr@comcast.net
Melinda Mallia	TNR	Plan Development Project Mgr	(512) 854-4460	Melinda.mallia@co.travis.tx.us
Jerry Raisch	Purchasing	Contracts	(512) 854-9724	Jerry.Raisch @co.travis.tx.us
David Gellner	TNR	Asst. to Plan Development Project Mgr	(512) 854-6613	David.Gellner@co.travis.tx.us
Kevin Connally	TNR-BCCP	Environmental Specialist	(512) 854-9437	Kevin.Connally@co.travis.tx.us
Pete Baldwin	OEM	Emergency Management	(512) 854-4242	Pete.Baldwin@co.travis.tx.us
Ben Avedikian	OEM	Emergency Management	(512) 854-4692	Ben.Avedikian@co.travis.tx.us
John Wilson	TNR-GIS	GIS	(512) 854-9383	John.Wilson@co.travis.tx.us
Stacey Scheffel	TNR-Dev Services	Floodplain Administrator	(512) 854-7565	Stacey.Scheffel@co.travis.tx.us
Anna Bowlin	TNR-Dev Services	Executive Support	(512) 854-9383	Anna.Bowlin@co.travis.tx.us
Don Wheeler	TNR-Roads	Executive Support	(512) 854-9435	Don.Wheeler@co.travis.tx.us
Carol B. Joseph	TNR-Exec Office	Executive Support	(512) 854-9383	Carol.Joseph@co.travis.tx.us
Rebecca Quinn	RCQuinn Consulting	Consultant	(410) 267-6968	rcquinn@earthlink.net

The following agencies were notified and invited to participate:

- City of Austin
- Texas Division of Emergency Management (will be invited to next committee meeting)
- Lower Colorado River Authority (will be invited to next committee meeting)
- Texas Water Development Board (will be invited to next committee meeting)

Meeting Discussions

Discussion centered around two areas. Public participation and integration of the planning effort with other jurisdictions. One of the suggestions to involve the public was to brief representatives from some large associations in the County and let them take the data back to their associations. These included:

Realtors Association, Association of Home Owner Associations, Volunteer Fire Department, Emergency Services, Building Association, and ECO Resources.

Joe Gieselman, TNR Executive Manager, was brought in after the meeting to discuss the two above subjects. His recommendations were as follows:

Public participation - Joe felt that public participation on the committee would be difficult to manage and recommended that we use Channel 17 to do a presentation on the Planning effort and invite comments (phone, email, fax). Travis County would do a mailing alerting people as to when the show would be televised.

Planning effort with other jurisdictions – Joe said we should strive to obtain input but the plan would be separate and Travis only.

Jeff and Don met with the State DEM, Bob Gibson, on the 17th of July to discuss how the State would like us to handle all hazards. Bob agreed that there were hazards that would be difficult to include in the plan for security reasons. In these cases, we could reference them in the plan. He said we should not over-use this approach, as he really wanted all hazards covered.

Mitigation Planning Committee Meeting #2 (September 12, 2002)

The Committee convened to review and address the following agenda items:

- Mitigation Planning Overview
- Discussion: Ways the County communicates with the public
- Discussion: What we know about flood (and other) hazards and how we will learn more
- Discussion: Overview of how hazards are factored into each department's responsibilities
- Discussion: Drafting a mitigation goal statement
- Discussion: Begin talking about possible mitigation actions

Travis County Mitigation Planning Committee Membership

The following members of the Committee were in attendance:

- Melinda Mallia, TNR
- Jerry Raisch, TNR
- David Gellner, TNR
- Kevin Connally, TNR
- Pete Baldwin, OEM
- Ben Avedikian, OEM
- John Wilson, TNR
- Stacey Scheffel, TNR
- Anna Bowlin, TNR
- Jeff Ward, Donald R. Ward & Associates
- Rebecca Quinn, RCQuinn Consulting, Inc.

The following non-committee members attended:

- Ed Schaffer, LCRA
- Susie Duarte, Capital Area Planning Council
- Gilbert Ward, TWDB
- Amber Johnson, City of Austin

Meeting Discussions

The meeting was opened with round the table introductions. The committee was reminded that this committee meeting is for group discussion, not formal presentations.

Mitigation Planning Overview

An overview of the planning process was provided as a reminder to all committee members and meeting participants of why we are developing a plan. Recent discussions with Gilbert Ward from the Texas Water Development Board regarding the concurrent development of a Hazard Mitigation Plan and the Flood Mitigation Plan were summarized. In this discussion, the recommendation was made that only one plan (a Comprehensive Plan) be developed and submitted to fill both requirements. Gilbert Ward and the committee agreed with this approach.

Discussion: Ways the County communicates with the public

- OEM uses the City of Austin web page to keep the public informed because it is much more interactive than the Travis County web site. The question was raised as to the possibility of adding a hotlink to the County's web site that would take you directly to the relevant emergency related information on the City of Austin web site.



- OEM uses the City of Austin's Flood Early Warning System (FEWS) to keep County residence informed of flood hazards along some waterways.
- OEM uses email lists to emergency support personnel to keep them informed of situations and emergencies throughout the region.
- County inspectors are often out looking at properties that have open B Permits. During these visits they are meeting face-to-face with residence addressing various questions and concerns.
- Walk-ins to the permitting counter are a great source of public communication.
- Road maintenance crews post signs in key areas prior to a public meeting. Typically, Travis County will hold public meetings when there is a high level of interest from the public following a disaster.
- After a flood, direct mail is used to communicate relevant data to all known and potential victims.
- Melinda mentioned the County does not have a central disaster/flood hotline. This results in the County getting inundated with calls across all divisions.
- LCRA runs a hotline for floods. They are now talking about opening up an information center.
- County does not have a reverse 911 system. When a warning is issues, broadcast media is used and emergency services personnel drive around and knock on doors.
- An overview of the public communication approach mentioned by Jeff Ripley of Agricultural Extension during his phone interview was summarized; Mr. Ripley mentioned public outreach via news releases on the TV and in newspapers; his office receives from County residents requesting information on a multitude of topics.

Discussion: What we know about flood (and other) hazards and how we will learn more.

The county-wide map provided by John Wilson, GIS, was reviewed. The map shows the FEMA floodplain (Q3) and point data for structures within the floodplain. Some relevant statistics indicated by this map are as follows:

- 13.9% of the county land area is in the 100-year floodplain.
- There are about 6,800 buildings in the 100-year floodplain (9% of all buildings)
- Twelve county facilities appear to be in the floodplain, mostly park facilities.

An overview of the hazard history data provided by OEM includes some relevant statistics:

- There have been 44 Austin/Travis County Emergency Operations Center activations since 1991.
- Four activations were associated with Presidential Disaster Declarations
 1. December 1991 - Christmas Floods
 2. June 1997 - Lake Travis Flooding
 3. October 1998 – Central Texas Flooding
 4. July 2002 – Severe Weather – Lake Travis Flooding
- Between 1986 – 2001, the Austin area (including counties) experienced 187 severe thunderstorms, 68 tornadoes, and 479 flash floods.
- Between 1973 – 2000, the Austin area experienced a total of 88 weather related deaths: Flood/flash flood – 44, Tornado – 30, Lightning – 6, Winter storm – 4, Extreme heat – 3, Severe thunderstorm – 1.

Discussion: Overview of how hazards are factored into each department's responsibilities

Prior to the meeting, several committee members were interviewed. Each reported on the top two or three ways hazards are addressed by their programs and how their division/program has been impacted. Detailed notes on each of the interviews will be provided to the committee members in the near future.

Discussion: Drafting a mitigation goal statement

Before the meeting a handout with background information on mitigation goal statements was provided to help facilitate the discussion. This handout included the concept behind a goal statement, FEMA and the State of Texas' mitigation goal, and examples of local mitigation goal statements form other jurisdictions local plans.

After some discussion about how far reaching the goal statement could be, the committee converged on one of the examples as being close to what they believe should be the goal: "The mitigation goal of this community is to protect public health, safety, and welfare by identifying natural and man-made hazards, by increasing public awareness of those hazards, and by fostering both individual and public responsibility in mitigating risks due to

those hazards.” There was discussion on how to modify this example to meet the committee’s desires and various suggestions were made. A revised goal statement will be provided to the committee for review in the near future.

Discussion: Begin talking about possible mitigation actions

There was open discussion about possible mitigation actions. A summary of the ideas follows:

- Central 800 number where County residents can call for information about recovery, cleanup, mitigation, and post-disaster permits.
- Joint information and communications group within the county (for all County Departments/Programs which are effected by or respond to disasters).
- Increase capability to communicate with the public post-disaster, and pre-disaster.
- Gather detailed information on structures in high-risk damage centers to have available when a disaster strikes, both for recovery, permitting, and grant application development.
- Increase predictive capability on those flooding sources where there is currently little advanced notice.
- Strengthen and clarify Counties floodplain ordinance.

Mitigation Planning Committee Meeting #3 (October 24, 2002)

Summary of Mitigation Planning Committee Meeting #3

The Committee convened to review and address the following agenda items:

- Review minutes of Meeting #2
- Discussion: More about property at-risk
- Discussion: Notes from Agency Interviews
- Discussion: Review draft goal statement
- Discussion: Mitigation actions

Travis County Mitigation Planning Committee Membership

The following members of the Committee were in attendance:

- Melinda Mallia, TNR
- David Gellner, TNR
- Pete Baldwin, OEM
- Ben Avedikian, OEM
- John Wilson, TNR
- Stacey Scheffel, TNR
- Anna Bowlin, TNR
- Don Wheeler, TNR
- Carol B. Joseph, TNR
- Rebecca Quinn, RCQuinn Consulting, Inc.
- Jeff Ward, Donald R. Ward & Associates.

The following committee participants attended the meeting:

- Ed Schaffer, LCRA
- Amber Johnson, City of Austin

Meeting Discussions

The meeting was opened with round the table introductions. The committee was reminded that this committee meeting is for group discussion, not formal presentations.

Review minutes of Meeting #2

There were no corrections or comments on Committee Meeting # 2 meeting minutes.



Discussion: More about property at-risk

- Reviewed the additional data gathered relative to properties at risk within the County. The data were broken down by Precinct and by watershed.
- The team was reminded of the relevant flood insurance policy data within the County.
 1. Structural damage – 420 claims for \$9.1 million (1978 – 2001)
 2. Contents damage – 182 claims for \$1.3 million (1978 – 2001)
 3. 56 properties filed 123 losses (as of 1999)
 4. The location of 68 HAZMAT sites and one fire station (#1108, 1600 Citation Drive) have been identified and geocoded as in of near the floodplain – the map showing these locations was reviewed.

Discussion: Notes from Agency Interviews

Participants indicated that they have not yet had an opportunity to review the interview notes. It was agreed that a reminder email would be sent requesting review and comment of these notes.

Discussion: Review draft goal statement

In committee meeting number two, the committee provided comments and recommendations for a mitigation goal statement. It was decided that the comments would be collated and a draft goal statement would be provided for review and comment prior to committee meeting #3. There was open discussion of this draft mitigation goal statement sent to the committee members. The committee made minor changes to the goal statement. It was agreed that the revised goal statement would be emailed to the committee members by mid-November for review and comment.

Discussion: Mitigation actions

In committee meeting # 2 the committee members had open discussion about possible mitigation actions. It was agreed that all comments would be collated and draft mitigation actions would be provided for review and comment prior to committee meeting #3. There was open discussion about these draft mitigation actions. The committee reviewed each possible mitigation action with the intent of agreeing that it should be kept as stated, modifying the action, or eliminating the action from the list. One draft mitigation action was eliminated as it was felt it was encompassed under another action; two were merged together, two were added, and several were slightly modified.

It was agreed that the revised mitigation actions would be emailed to the committee members in mid-November for review, comment, and prioritization. All committee members will be asked to rate each action as: High priority, Low priority, Don't know, or should be deleted. Once all committee members provide their comments and prioritization, the list will be prioritized and submitted back to the committee for review and comment.

The date for Committee meeting # 4 was not finalized. It was agreed that a draft timeline would be provided to Melinda Mallia indicating the steps and timing necessary for completion of the draft plan. Melinda will then add the plan approval timeframe and the plan timeline will be finalized.

The next step is the submittal of a draft plan to the committee members for review and comments. The committee members will have ample time to review and comment on this draft plan. At committee meeting # 4, the committee will approve the draft plan for public review and submittal to the County Council for consideration and approval.

Mitigation Planning Committee Meeting #4 (May 29, 2003)

The Committee convened to review and address the following agenda items:

- Review May 28th Public meeting and comments
- Review Preliminary comments from Texas Division of Emergency Management
- Review Actions: Priorities, lead agency, notes, funding
- Confirm linking actions to elements of the mitigation goal statement
- Approve draft resolution forwarding to Commissioners Court for adoption

The following members of the Committee were in attendance:

- Melinda Mallia, TNR
- Pete Baldwin, OEM
- Jerry Raisch, Purchasing
- Ben Avedikian, OEM
- Stacey Scheffel, TNR
- Anna Bowlin, TNR
- Don Wheeler, TNR
- Kevin Connally, TNR
- Rebecca Quinn, RCQuinn Consulting, Inc.
- Jeff Ward, Donald R. Ward & Associates.
- Don Ward, Donald R. Ward & Associates.

- The following committee participants attended the meeting: Ed Schaffer, LCRA

Meeting Discussions

- Review May 28th Public meeting and comments – the committee was informed that, although well advertised, no one from the public showed for this meeting.
- Review Preliminary comments from Texas Division of Emergency Management – the committee was informed that Pete Baldwin, Stacey Scheffel, Melinda Mallia, Rebecca Quinn, and Jeff Ward met with Mike Harman, Regional Liaison Officer, and Mary Evan both from DEM. The purpose of the meeting was to do a preliminary review of the Draft Plan against the Texas Crosswalk and Annex P requirements. In general, the plan was deemed to be “headed in the right direction” and there were minimal suggestions for improvements and clarification.

Mary Evan made a couple of comments at the beginning of the meeting that were shared with the committee.

- a. The Travis Plan will be only the second comprehensive plan submitted to DEM/FEMA in the State of Texas. The first has yet to be approved. DEM and FEMA are going to hold these first couple of plans “under a microscope” as they want to get them to a point that they can be used as the model for other communities to follow.
- b. FEMA knows that the deadline to have Plans approved is November 2004, therefore, they are in no hurry to approve these first couple of plans. They would rather spend extra time in the review process getting them perfect.

In general, the comments that were made during the review meeting were as follows:

1. When the crosswalk and annex P ask that the plan identify or describe something in particular, the plan must address this item even if it is not relevant within the County.
2. Suggested the plan be expanded to include specific data about what is at risk from each hazard type. At-risk data for all hazard types must include; number of people, number of housing units, dollar value of housing units, critical facilities, special facilities, infrastructure, hazmat facilities, and commercial facilities.
3. Suggested that we add information specific to the effectiveness of prior mitigation actions taken using federal funds. Specifically, including the dollar value of prior HMGP grants and the mitigation cost savings resulting from these mitigation actions.
4. List all sources the committee used to encourage public involvement.
5. Add information regarding public involvement in the plan maintenance process.



-
- Review Actions: Priorities, lead agency, notes, funding – The committee reviewed all high priority actions to confirm priorities. All high priority mitigation actions remained high priority and the committee recommended moving one medium priority mitigation action to high priority. For each high priority action, the committee discussed the appropriate agency for lead (and support) and characterized acceptance (political and community). The matter of funding for each item was discussed, whether it could be performed within current budget or might require a new request. The “cost effectiveness” of each action was discussed and determined qualitatively. It was noted that some actions are difficult to quantify, such as the benefits of public information.
 - Confirm linking actions to elements of the mitigation goal statement – The committee completed the exercise of linking the each mitigation action to one of three elements of the goal statement.
 - Approve draft resolution forwarding to Commissioners Court for adoption – the committee formally approved the draft plan for submittal to the Court for adoption. It was agreed that Joe and Melinda would revise the draft resolution as required

Appendix C

Interviews with County Officials

These notes are based on interviews with identified County staff.

TRANSPORTATION & NATURAL RESOURCES DEPARTMENT

TNR: Environmental Coordination (Melinda Mallia):

- Identify funding sources, write grant applications, obtain funding.
- Manage grants and some projects for disaster assistance, parks, and solid waste (multiple programs in TNR, with exception of transportation).
- Oversee grant-funded projects.
- Develop county environmental policies.
- Coordinate environmental compliance reviews for county projects (primarily new roads and bridges).
- Coordinate with State and Federal environmental programs, e.g., wetlands.
- Manage coordinated intra-departmental review of development proposals by the private sector (subdivision, single lot, residential, non-residential)
- Seldom involved with private utilities (private water supply, private wastewater treatment).
- County participates in a state program to help with wastewater treatment problems in colonias areas.
- County currently does not operate any active landfills; closed landfills are monitored for groundwater quality impacts.
- One City of Austin landfill is active and located in Travis County.

TNR: Development Services (Anna Bowlin, Stacey Sheffield):

- Processes development permits; two types of permits are issued: Class A (basic development permit for no 100-year floodplain on the property) and Class B (with 100-year floodplain anywhere on the property).
- Other permits:
 - Utility permits: review for impact of installation under streets; ensure installations will be installed to be reasonably safe from flooding.
 - Driveway permits (about 2,500 per year).
 - Septic permits for on-site sewerage (LCRA issues for proposals within 2,250 feet of Lake Travis).
- Citizens are aware of the requirement to obtain a permit based on general knowledge, being informed by county inspectors, and contractor awareness (no business license requirement).
- All permitting is recorded by legal description, not address, and permanent records are retained.
- Applications for subdivisions that have designated floodplain areas typically are accompanied by a full engineering study; boundaries of the floodplain (and drainage easements) are recorded on the plat and referenced when subsequent permits to build individual buildings are obtained.
- Site plans for all subdivisions (and proposals that exceed 20% impervious cover area) must include existing and proposed ground contours. Serious discrepancies with the SFHA that are revealed by better topographic mapping must be resolved with FEMA by the Letter of Map Revision process.
- Permitting requires that all floodplain land in a subdivision be dedicated as drainage easement
- Plat notes include a statement that “no construction in drainage easement without prior approval of Travis County.” As part of the approval process, applicants are encouraged to keep development out of the flood plain.
- Statistics on permit activity do not identify whether a B permit authorized placement of a building in the floodplain.
- All B permits are flagged for site inspection, especially those permits that include activities within the floodplain.
- Typical elevation method is on block piers, increased use of stem wall (filled foundation walls).
- If fill is used, residential owner is advised of FEMA’s compaction requirement; non-residential owner usually has an engineered design.
- Substantial Improvement: the ordinance has a cumulative provision for determining substantial damage; this is administered by checking the database of all permits issued since 1995. Applicants for improvements are notified when they get permits. As of mid-2002, no application has been subject to the cumulative requirement.
- Substantial Improvement: For initial review, “fair market value” is determined using tax records and applying a 15% multiplier; owner may obtain an independent appraisal.



- Manufactured Housing: engineered foundations are required if elevated more than 5'; dry-stacked block is not allowed by the regulations, but difficult to control.
- Houseboats on Lake Travis are controlled by LCRA. They are powered and therefore are not considered "structures."
- Agricultural uses are unrestricted, but subject to permit requirements, and include uses such as "construction stock ponds, terraces, dikes, ditches and levees and other soil conservation actions to the standards of the Soil Conservation Service and/or under the direction of the Travis Soil Conservation Districts."
- Elevation Certificates are required on new or substantially improved buildings in the floodplain, and a database of the Lowest Floor Elevation and Base Flood Elevation is maintained.
- Development in SFHA: Since January 1999, 124 permits have been issued for buildings in the FEMA floodplain.
- Additions to SFHA buildings: Since January 1999, 3 permits have been issued for additions. Additions to post-FIRM buildings must be elevated. Additions to pre-FIRM buildings are allowed if not substantial improvements.
- Variances: Variance requests go before the Commissioners Court with a staff report that includes recommendations. Although some difficulties occurred in the early '90s, only one variance has been granted since 1992. It allowed a building to be 0.3' below the required elevation (with freeboard), thus it is 0.7' above the BFE and not a variance to the NFIP minimums. This situation was discovered after construction.
- Subdivisions begin with submitting a subdivision plan or final plat and must meet floodplain requirements set forth in the regulations.
- Applicants that disagree with flood plain boundaries outlined on the FIRMs must complete an engineering study and submit for a CLOMR. Approval is withheld until FEMA approval is received.
- Travis County's only authority for subdivision regulation is with respect to streets and drainage.
- The county works with developers to avoid putting roads in flood hazard areas. One requirement is that new access roads should have no more than 9" of water during the a 100-year flood event. This also applies to the joint use private driveways serving 3 or more houses.
- Subdivision developers are responsible for runoff and many are putting in retention ponds. Homeowner associations or local Municipal Utility Districts (MUDs) typically own the ponds as common areas and are responsible for their maintenance (no formal requirement).
- The subdivision standards require tornado shelters in all new mobile home parks (Sec. 232 Local Government Code).
- The county requires developers to place permanent survey monuments in all new subdivisions, recorded on plats but not maintained as separate database.
- Especially given recent flood experience, most developers and engineering firms understand flood hazards and are receptive to reasonably keeping buildings on higher ground.
- Permit applications within the Extra-Territorial Jurisdiction (ETJ) areas (around all 22 cities located within Travis County) are subject to joint requirements.
- Recently passed House Bill 1445 requires the county and cities to work cooperatively for consistency in regulating development in the ETJs.
- Interlocal agreements for joint reviews of permits are executed with the City of Austin, Pflugerville, and Lakeway. Similar agreements are in development with Cedar Park and Bee Cave.
- The county has begun to keep records of reported drainage problems (water in yards, ditches) and anticipates developing criteria to determine priorities for resolving certain problems.
- Stormwater management provisions, included in drainage and subdivisions regulations, require stormwater management systems to handle the increased runoff associated with a 100-year storm event.

TNR: Road & Bridge Maintenance (Don Wheeler):

- Functions include rebuilding and maintaining county roads, including drainage ditch clean-out and mowing
- Approximate length of roads (1,200 miles county-owned miles; 500 miles State-owned; 3,000 miles owned by cities and others).
- Number of waterway crossings in Travis County (144 bridges, 10,000 culverts; 110 low water crossings).
- Maintenance of bridges and culverts, including debris removal within the county's right-of-way (ROW) This may go outside of ROW if debris above a stream crossing appears to pose an imminent threat.

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- Many roads have low-water crossings and are designed to flood even under minor high water conditions. Some of these roads however no longer have low traffic volumes.
 - There has been minimal damage to roads and bridges from flooding (mostly shifted asphalt), attributed to relatively low velocity of flood flows when roads are overtopped.
 - Debris removal is the biggest disaster-related expense. Debris at bridges and culverts and downed trees are moved to the ROW for disposal.
 - After heavy rains, maintenance crews inspect those areas that have historically had problems to check for debris and damage.
 - When floods are predicted, emergency teams are organized from the four satellite offices.
 - Flooded roads are closed; some are closed early due to knowledge of likelihood of flooding.
 - When ice storms are predicted, bridges are sanded to improve road safety.
 - County equipment has been used to assist with forest firefighting efforts.
 - Sand is stockpiled for spreading on bridges when icy conditions occur and county trucks have spreaders.

TNR: Engineering & Planning (Roger Schuck, David Fowler):

- Developers must build roads to county standards before the county will take ownership and maintenance.
- The County uses engineering standards and guidelines to determine the appropriate size for bridges and culvert crossings. The size also depends on the traffic/classification of the road and the availability of funds.
- In general, for new construction the intent is to size waterway openings so as to:
 - Minimize Floodway impacts consistent with the county's floodplain management objectives to have keep structures out of the Floodway,
 - Have no more than 6-inch depth of water under the 100-year flood discharge,
 - Minimize backwater, typically 3-4 inches, but not more than a 1-foot increase, and
 - Protect piers and abutments against erosion (using HEC-RAS for scour analyses).
- Most waterway crossings and road projects are funded entirely by the county. Federal standards are effective when state/federal funds are involved.
- TXDOT periodically looks at every bridge (clear span of +20-feet). Several factors are examined, including structural integrity and evidence of scour. A rating score is assigned and a report provided to the county; used in ranking replacements and upgrades.
- TNR Road Maintenance performs routine, cursory inspections to observe structural conditions and scour.
- The county's survey staff includes three Registered Licensed Surveyors.
- Since 1982, the County has not operated any landfills, but continues to monitor and address various conditions such as groundwater, erosion, etc..
- The "Highway 183 Landfill" is inactive; now located in the City and owned by the YMCA; large part is affected by floodplain of Walnut Creek; a 1995 project by the County stabilized about 350' of streambank with gabions to address erosion problem.
- The "Highway 290 East Landfill" includes floodplain of Walnut Creek but has been inactive for over 20 years; the County has implemented erosion control measures.
- A City-owned landfill is across Onion Creek from Moya Park; currently accepts only Type IV construction debris; in early 1990s a "mass movement of material" was caused by saturated conditions and slumped into the creek causing flooding. To address some erosion problems the County installed about 200' of gabions along the streambank in the park..
- Five major commercial landfills are active. Two have performed work in floodplain areas: Waste Management and BFI (both are located immediately upstream of the City's Highway 290 E Landfill); TCEQ regulates private landfills.
- County's floodplain ordinance was modified in 2002 to establish a requirement for solid waste facilities to delineate a 500-foot buffer extending from the landward boundary of the 100-year floodplain.

TNR: Inspections (Dennis Case):

- Six inspectors operate in four service areas.
- Inspectors are charged with performing inspections of permitted activities. A database is shared with the Permits Department.



- Part of their responsibilities is to check for unpermitted activities (including buildings and fill/dumping) and to investigate complaints. If a permit cannot be produced for work in progress, a “red tag” is issued and work is suspended until a permit is provided or obtained.
- The county recently adopted a formal enforcement policy; it sets forth procedures to inform property owners who undertake unpermitted activities, to encourage compliance, and to make referrals for legal action.
- Inspectors become familiar with their assigned areas, including familiarity with the waterways and floodplains.
- TNR Development Services provides copies of all “B” permits (those that include floodplain/drainage easements). A visual check of the slab/foundation is made but the location of the footprint with respect to the waterway/floodplain is not done (site plans not provided).

TNR: Park Planning (Wendy Scaperotta):

- Maintain a comprehensive 5-year Master Plan for Travis County Parks; beginning revision cycle this year; prepared according to State guidelines; evaluates population and trends and projects usage and demand for parks.
- Travis County has recently issued bonds for parkland acquisition and development of new facilities (as opposed to maintenance of existing facilities).
- The county manages seven Lake Travis park areas owned by the LCRA. The budget includes the maintenance of facilities and capital improvements in these areas.
- Some county parks include areas mapped as floodplain. For the most part such areas are retained as open space.
- Due to flood damage in Richard Moya Park on Onion Creek, a previous policy allowing development of recreational facilities in floodplains has been altered to avoid any active recreational development.
- Identified in the June 2002 update of the Master Plan, Richard Moya Park will include the county’s only designated greenway, largely based on acquisition of land from which flood-prone homes are removed.
- New or replacement park improvements are undertaken in ways that minimize future damage, for example restrooms are built to flood and be cleaned out easily.

TNR: Balcones Canyonlands Preserve (Kevin Connally):

- The Balcones Canyonlands Preserve (BCP) currently consists of 26,361 of the proposed 30,428 acres owned or managed by several property owners, including Travis County. The Preserve system was established to meet the terms and conditions of a regional permit issued in 1996 by the US Fish & Wildlife Service under Sec. 10(a)(1)(B) of the Endangered Species Act.
- Ice storms that result in tree damage and limbfalls increase fire risks for many years due to build-up of woody materials on the ground.
- Some in-holdings of private property remain.
- The BCP exists to protect habitats for and populations of eight species listed by the USFWS as endangered, and an additional 27 considered “species of concern.”
- Significant portions of the preserve are uplands or steep canyons; the land is steeply sloped so that stream channels run in narrow valleys with little or no flood plain in the Preserve.
- There is a fair amount of urban/wildland interface due to private development that backs up to Preserve boundaries, raising increased concerns about fire hazards.
- The county has memoranda of understanding with state and federal agencies, adjacent counties, and all Emergency Services Districts in the area to provide fire response.
- County efforts have focused on education and public outreach to encourage private property owners to reduce the risk of damage from wildfires, and on fostering planning and cooperation between the BCP Partners and emergency responders
- West of IH-35, the hilly terrain results in more condensed development in those areas that have buildable land, increasing the risk of wildfire and consequently increasing risks to buildings.
- The City of Austin has been awarded FEMA Project Impact funding and is developing fire risk assessments, fire hazard mapping, ignition sources, vegetation types and density in order to preplan and focus resources in cooperation with the BCCP Partners

TRAVIS OFFICE OF EMERGENCY MANAGEMENT (Pete Baldwin, Ben Avedikian):

- Founded in 1992 to be in compliance with State and Federal regulations.
- Maintains the County's Emergency Operations Plan (covers the county and 10 cities). The primary purpose of the EOP is to prepare jurisdictions to handle disasters by coordinating emergency planning and response, defining responsibilities and establishing protocols.
- Operates a combined emergency communications center with the City of Austin and Pflugerville; facility will also house staff from TXDOT and Capital Metro.
- PSAP – Public Safety Answering Program is a system that receives emergency calls and routes the call the appropriate dispatch for police, fire, and EMS.
- Outside of the City of Austin, there are 13 Emergency Service Districts serving the county. They provide fire and emergency medical services. The ESD's coordinate through the county if incidents require additional resources.
- Natural disasters within Travis County that have caused loss of life include floods, windstorms, tornadoes, ice storms and drought.
- Flood warning is closely coordinated with the City of Austin and LCRA:
 - Generally issued through public media;
 - City of Austin maintains the Flood Early Warning System (FEWS) for some watersheds (rain and stream gauges) [*contact made with City to ID which streams*];
 - Warning in Onion Creek is problematic because most of the creek's watershed is in Hays County and the only USGS gauge washed away, so very little pre-flood data is available.
 - The LCRA gives about 6-hours warning to the county prior to opening gates on Lake Travis/Mansfield Dam.
- Through a partnership with Austin's Project Impact and a matching grant from JP Morgan, facilitated procurement of NOAA weather radios for all schools in Travis County.
- The LCRA has an extensive dam safety program, including inspections, maintenance and repair.
- Dams not on the Colorado River are regulated by TCEQ (formerly known as the TNRCC).
- There are some high hazard, privately-owned dams within and upstream of Travis County.
- Wildfire has been a problem, but the list of past activations does not include wildfire incidents. A multi-jurisdictions/ESD response will be coordinated for large incidents.
- A Travis County Resource Coordinator is always on duty. Staffing is on a rotating schedule by county managers:
 - ESD's contact the County Resource Coordinator if assistance is needed;
 - Additional support can be drawn from other ESDs so as not to strip all resources from any part of the county in case another activation is required.
- There are no critical facilities (e.g., hospitals, EOCs) in Travis County.
- There is a Local Emergency Preparedness Committee (LEPC). The LEPC is federally-mandated, meets every two months and the primary focus is public awareness and hazardous materials.
- Most reported hazardous materials fixed sites (handlers, storage) are located in the City of Austin. A database of user addresses is available (may not be physical location of the materials).
- In the county, concern is due to transport incidents and chlorine used at the 95 water treatment companies throughout the county, some of which are likely to be in floodplain areas.
- There have been no reported HazMat incidences related to flooding
- The EOC has been activated for civil unrest.
- OEM has participated in Department of Justice training exercises for technological threats, including terrorism, and is seeking funding for training and equipment.
- Terrorism and weapons of mass destruction threats and vulnerability assessment is on-going. Although not publicly available, it is characterized as including dams, pipelines, water treatment facilities, sewer treatment facilities, and other public facilities.
- Texas A&M, coordinating with the American Red Cross, conducted a shelter evaluation in Travis County.
- Ice from winter storms can cause problems for up to 3 days, less than 48 hours is more common. The State has an ice response plan to address major roads.



COUNTY FACILITIES (Dan Mansour, Risk Management):

- Among other responsibilities, the Risk Management office manages property insurance. The County's property insurance coverage for buildings and improvements has a \$500,000 deductible.

AGRICULTURAL COOPERATIVE EXTENSION (Jeff Ripley):

- The Cooperative Extension is a partnership, supported by state funding (60%) and federal funding (10%).
- This serves everyone in Travis County and incorporated cities, although have "limited resources"; services are defined by the state.
- The focus is on the assistance and education of the public on a variety of questions and issues, especially related to horticulture, agriculture, water quality (but not on-site septic), erosion; wildlife concerns (e.g., chronic wasting disease), tree maintenance (such as trimming trees damaged by ice).
- In 2002, there has been considerable interest about West Nile virus.
- Public awareness is generated via news releases to newspapers, radio and television.
- Some information related to flood is kept, but mostly about mosquito and fire ant control, and recommendations for drying to minimize mold problems.
- During the past couple of floods there were no special agricultural related issues or projects:
 - Not aware of any agricultural buildings that were damaged,
 - Flooding is seen as a normal part of the cycle by most farmers.
- Maintain, and expect to expand, a website (www.travis-co.tamu.edu).

DAMAGE AND IMPACTS DUE TO FLOODING HAZARDS

- Carlos & Charlie's, a Lake Travis restaurant, was destroyed in the 1997 flood (was at-grade, below the BFE by 24"); it was reconstructed as a "dry dock barge" with restrictions for operations during flooding.
- One non-residential property near Bluff Springs (a carpet store) flooded in 1998 and 2001.
- An address file of some of the flood-prone property owners is maintained (primarily Lake Travis property, Onion Creek property, and the NFIP repetitive loss list). Some direct notification has been done.
- After floods, inspectors monitor areas where buildings were damaged (especially near Lake Travis and Onion Creek).
- In flooded areas, it is usually several weeks before rebuilding is started, which allows time to inform owners of permit requirements, and ensure that FEMA materials have been handed out.
- Manufactured homes have washed off of foundations by floodwaters, attributed to lack of tie-downs rather than foundation failure.
- A City landfill that is in the floodplain of Onion Creek across from Moya Park accepts only type IV debris (construction waste). A portion of the site slid into Onion Creek during a flood; the banks have been shored up to minimize recurrence.
- One closed landfill is located in the floodplain
- Some private landfills may have floodplain impacts, e.g., IBM Rolm on Walnut Creek.
- County parks that include flood-prone areas have sustained damage of facilities and improvements such as the fee booth, picnic tables and pavilions, restrooms, playscapes, fences, electrical and irrigation systems, and trails. Most damage is associated with heavy debris loads.
- Moya Park has sustained the most damage in the past decade (total cost for recovery was about \$280,000); some improvements relocated to higher ground where velocities are expected to be lower.
- The Moya Park Ranger residence has experienced repetitive flooding, most recently in October 1998 and November 2001. It was not re-occupied after the 2001 event and has been demolished and will not be rebuilt.
- At Hamilton Pool, extensive sections of fencing were damaged due to debris loading.
- Lake Travis parks are known to experience flood damage including: damage to docks due to rapid rise; inundation of restrooms causes damage only if roofs go under and shingles are damaged. *[Estimate dollar value of repair, restoration and clean up from last two floods]*
- The Northeast Metro Park low water crossing has been damaged by floodwaters eroding its base. Repairs to the crossing will include additional concrete.
- County parks with streams have sustained some bank erosion damage. In Moya Park repairs were made with riprap and gabions.

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- The Vehicle Services building was flooded in November 2001. Costs to clean up the building and vehicles was approximately \$8,000.
 - Damage sustained by county buildings as a result of federally declared disasters has not been covered by FEMA because they were determined to be not eligible or were “below the \$500,000 deductible.”
 - Since at least the mid-1980s, bridge piers have not been undermined by flooding.
 - Floods seldom cause structural damage or failure although earthen embankments behind abutments wash out.
 - Jones Road was flooded, scouring the embankment behind the abutment. No structural damage was sustained because the abutment is founded on deep piers.
 - Parsons Road experienced erosion at the bridge due to flow alignment. Upstream channel work with gabions were installed divert flow more efficiently through the bridge.
 - County maintenance records indicate that little road, bridge and culvert damage resulted from the November 2001 flood.
 - The Christmas 1991 flood caused some road damage.
 - Parsons Road is impacted when Wilbarger Creek floods with water depths over 2-feet for long periods (24-48 hours) resulting from 3 – 4” of rain. As development expands in that direction, this road is experiencing an increase in traffic. Although not flood-related, improvement of this road is already in the planning phases.
 - After the December 2001 flood, woody debris was ground for mulch and stockpiled in county parks for use in maintaining the park. However, due to the large volumes, some had to be hauled to landfills for disposal.
 - TNR Road & Bridge Maintenance maintains records of road flooding, indicating 44 points of frequent flooding (by district: 11 flood-prone roads in District 1; 10 in District 2; 11 in District 3; and 12 in District 4).
 - The state corrections facility is likely subject to flooding, at least grounds.
 - [Have any private non-profit water companies (supply or treatment) submitted project worksheets for damage due to declared disasters?]

DAMAGE AND IMPACTS DUE TO OTHER NATURAL HAZARDS

- Lightning and high winds have damaged trees and sport field light poles in county parks.
- The Exposition and Heritage Center in East Austin sustained damaged windows due to wind; was covered by insurance.
- Lightning struck a county chilling tower in 2000. The cost for repairs was covered by insurance.
- A major ice storm in 2000 caused widespread tree damage in the Balcones Preserve, increasing fire threats for years due to the length of time it takes for fallen trees to deteriorate.
- In 1995, a tornado caused damage in the Hazy Hills subdivision (east of the Pedernales River at Highway 71). There was tree damage, a dozen roofs blown off, and several overturned mobile homes.
- The last wildfire in the area occurred in the mid-60s and affected 400-500 acres.

Published Notice for First Public Meetings

H12 Sunday, February 2, 2003

Austin American-Statesman ■ statesman.com

Public Notice
Travis County Hazards
Mitigation Plan

Two public meetings will be held February 11 & 12, 2003, at 6:30 p.m., to present an overview of a planning process recently started by Travis County. The process will lead to a plan of action to the long-term impacts of flooding and other hazards on the County and its citizens. Members of the public are encouraged to attend, especially those with property located in flood-prone areas.

Western Travis County Meeting
Tuesday, February 11
6:30 - 8:00 p.m.
Wild Basin Wilderness Preserve
Education Building
805 North Capitol
Texas Highway

Eastern Travis County Meeting
Wednesday, February 12
6:30 - 8:00 p.m.
Travis County Satellite
One Town Hall
9301 Johnny Morris Road

Attendees will be asked to help identify problem areas and offer recommendations for the County to consider. If you cannot attend one of the meetings, more information about the plan and a questionnaire can be downloaded from the County's web page (www.co.travis.tx.us). Completed questionnaires should be faxed to Melinda Mallia at 512-854-6474, or mailed to her attention at the Travis County Department of Transportation & Natural Resources (TNR), P.O. Box 1748, Austin, TX 78767-1748. The final hazard mitigation plan will be presented to the Commissioners Court for adoption later this year. Additional public meetings will be scheduled before then to present the draft recommendations and request additional comment from interested citizens.

Questions about the plan should be directed to TNR's Mitigation Plan Consultant, Jeff Ward at 866-465-7105 (toll free number). You can also contact Scheleen Walker with Travis County TNR at 512-854-9430 for more information.



Organizations, Agencies and Elected Officials (received Notice of first public meetings)

In addition to 409 notices mailed directly to individuals and citizens who have filed flood insurance claims, the following received public notices:

Austin Metropolitan Trails Council	Texas Parks & Wildlife
Austin Neighborhoods Council	Texas General Land Office
Austin Parks Foundation	Texas Council on Environmental Quality, NFIP State Coordinator
Barton Springs Edwards Aquifer Conservn Dist	FEMA Region VI
Capital Area Planning Council	TX Division of Emergency Management, Mitigation
Clean Water Action	Texas Water Development Board
Environmental Defense	
Groups United Against Rural Destruction	Senator Kay Baily Hutchinson
Hill Country Conservancy	Senator John Cornyn
Real Estate Council of Austin	Congressman Lamar Smith
Save Our Springs Alliance	Congressman Lloyd Doggett
Sierra Club - Austin Club	Congressman Ron Paul
Sierra Club - Lone Star Chapter	State Senator Jeff Wentworth
Texas Community Project	State Senator Gonzalo Barrientos
Trust for Public Lands	Representative Todd Baxter
TX Campaign for the Environment	Representative Dawna Dukes
TX Colorado River Floodplain Coalition	Representative Eliot Naishtat
TX Homebuilders Association	Representative Eddie Rodriguez
Travis Audubon Society	
Liveable City	

Hazard Mitigation Plan: Public Meetings – 2/11-12/03

Western Travis County Meeting Tuesday, February 11, 2003 6:30 – 8:00 p.m. Wild Basin Wilderness Preserve 805 North Capitol Texas Highway	Eastern Travis County Meeting Wednesday, February 12, 2003 6:30 – 8:00 p.m. Travis County Satellite One Town Hall 9301 Johnny Morris Road
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Approximately eight homeowners attended the Western Travis County public meeting (estimated to represent five properties in Western Travis County). Approximately twelve homeowners attended the Eastern Travis County public meetings (estimated to represent nine properties in Eastern Travis County).

Presentations were made to explain the requirements for the development of a hazard mitigation plan and asking for public input on historical hazards within Travis County and recommended mitigation actions to help alleviate future property damage and loss of life. Attendees noted a number of concerns and raised several questions (summarized below). A questionnaire, available on the Internet, was handed out at the public meetings (summarized below).

Questions and Concerns Raised at the Public Meetings

- Concern: The Lower Colorado River Authority's actions on Lake Travis. Homeowners suggested that the LCRA had failed to move swiftly enough in anticipating storms and mitigating the possible damage to homes on the lake.
- Response: The County's floodplain manager said the LCRA must consider the entire watershed-not just Lake Travis-when it makes decisions to open and close dam gates. Decisions on lake levels are complicated by the many factors that need to be considered, including the needs of water users downstream.
- Question: How accurate are FEMA's Flood Insurance Rate Maps used in Travis County?
- Response: In many cases the maps are twenty years old, but the best available data was used to develop the maps at that time. Further, there is clearly better technology and data available today and eventually the maps will be updated to reflect this more accurate data.
- Question: How often are FEMA's Flood Insurance Rate Maps revised?
- Response: Although for many years constrained by budget limits, FEMA revises maps when there is significant evidence that maps need to be revised. Travis County reports map needs to the State; Congress has begun to appropriate additional funds to support revising maps.
- Question: Why did I receive a mailing informing me of this public meeting? Has Travis targeted my for acquisition?
- Answer: Along with multiple other communication channels, Travis mailed notices to about 500 property owners throughout the County that are on a list as having received disaster assistance or flood insurance claims. It is possible a previous owner filed a claim.
- Question: How far along in the planning process are you?
- Answer: The Planning Committee has held three meetings. The focus of these meetings and data gathering has been on understanding the historical hazards that have affected the County and to get ideas on possible mitigation actions. This phase of the planning process is to get public input on historical hazards and possible mitigation actions prior to preparing the draft plan. Public comments from these public meetings and public questionnaire responses will be incorporated into the draft plan for Planning Committee review prior to submittal to Commissioners Court.



- Question: Will the plan identify the feasibility of specific mitigation projects?
- Answer: The plan will not provide in-depth analysis of the feasibility of specific mitigation projects. Rather, the plan will identify general mitigation actions the County believes may prevent future property damage and loss of life. If any of these general mitigation actions require further feasibility and/or engineering studies prior to implementation, the County may prepare such studies as required and appropriate.

- Question: Why have we seen two 100-year floods in the past 10 years?
- Answer: The term “100-year flood” is a misleading name for the base flood that is used to define the area subject to regulations. It means that there is a 1% chance every year that the County will receive enough rain in a set period of time to cause water levels in river and stream valleys to rise to the base flood elevation.

- Question: Is FEMA looking to update the maps due to upstream development?
- Answer: This is one factor that FEMA considers when deciding whether to revise the flood maps. In part to anticipate watershed development, which causes more rainfall to run off rather than soak into the ground, Travis requires new buildings to be elevated one-foot above the base flood elevations.

- Question: What funds is Travis looking to be eligible for by completing this plan?
- Answer: Currently, there are two primary sources of funds available from FEMA for flood mitigation measures: Flood Mitigation Assistance (FMA) Program funds (available pre-disaster); and Hazard Mitigation Grant Program (HMGP) funds (available post-disaster).

- Question: Why is my flood insurance so high?
- Response: Some specific questions were asked of this homeowner to better be able to answer this question. It was pointed out that the best person to talk to about this concern is an insurance agent who is experienced with selling FEMA flood insurance. On the surface, it did appear that this homeowner was paying a higher rate than he should and he was given a phone number to call to get additional assistance.

- Question: Are you coordinating with local municipalities while developing the Travis plan?
- Response: LCRA, and the City of Austin attend planning committee meetings. The plan will be for the unincorporated areas of Travis County only. Once complete, the plan will be made available to all incorporated areas within the County. Many of the incorporated areas within Travis are participated in a multi-jurisdictional plan that is being facilitated by LCRA. Municipalities interested in being eligible for future FMA and HMGP funds will need an adopted and FEMA approved plan or appendix to a plan. The Travis plan can be used as a template for the development of an adoptable appendix for those municipalities not participating in the LCRA multi-jurisdictional plan.

- Question: Travis considering anything other than buyouts for the Timber Creek subdivision?
- Response: The U.S. Army Corps of Engineering is currently studying Onion Creek for possible mitigation projects. Any mitigation action that may eventually be taken as a result of this Corps study is at least five years out. The County is continuing to look for federal grants to assist with additional buyouts for flood damaged properties in Timber Creek. At this point Travis believes that acquisition is the best mitigation action for Timber Creek.

- Question: Why didn't Travis County buyout homes flooded in November 2001 in Timber Creek?
- Response: As bad as this flood was for homes in Timber Creek, it did not receive a Presidential Disaster declaration. Therefore, there were no federal funds made available for buyouts.

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- Question: Is the plan going to augment the Emergency Response Plan (ERP) or is it going to stand alone?
 - Response: The plan will meet many of the State's ERP Annex P requirements and as such will augment the ERP.
 - Can I buy insurance from NFIP directly?
 - Response: Yes. County staff took contact information for this homeowner and will provide a number for NFIP.
 - Concern: Homes in Walnut Place, along Walnut Creek continue to lose land into the creek. It is felt that this is due to prior projects within and along the creek. The homeowner was at the meeting to continue to express concern over what is happening to these homes.
 - Response: The County is well aware of this concern. Staff listened to the property owner's concerns after the meeting concluded. This property within Travis County unincorporated and it is the County's position that they have no jurisdiction or responsibility for any potential cause of this problem or any potential solution.



Summary of Questionnaires

Questionnaires were submitted by twelve citizens who attended the public meeting or downloaded the document from the County's webpage. The following is a summary of the comments and recommendations from these submittals:



TELL US WHAT YOU KNOW ABOUT FLOODING IN TRAVIS COUNTY and SHARE YOUR IDEAS ABOUT REDUCING FLOOD DAMAGE

This questionnaire is to collect information about flooding in your community. Travis County has started to prepare a plan to help reduce flood damage and other safety risks. An important part of the planning process is hearing from our citizens. We will hold a public meeting to present the draft plan sometime in the spring. At that time you will learn about mitigation planning and proposals to reduce damage.

You can help us now. We would like to learn about any flooding problems you may have had at your home or business. Please take a few minutes and answer the following questions. Please use additional paper if your answers will not fit in the spaces provided. Questions? Call Scheleen Walker, Travis County, 854-9430.

Question	Summary of Answers Submitted
Is your home in the floodplain?	<ul style="list-style-type: none">■ All but one respondent answered yes
What is the source of flooding?	<ul style="list-style-type: none">■ Poor drainage■ Lake Travis■ Slaughter Creek■ Walnut Creek■ Onion Creek■ Mahia Creek
Do you own or rent?	<ul style="list-style-type: none">■ All but one respondent "own the property"
How would you describe your home?	<ul style="list-style-type: none">■ Crawlspace■ Slab■ Wood pilings or block pier■ Pier and beam
If your home has actually flooded, when did it happen?	<ul style="list-style-type: none">■ 1952, 1973, 1974, 1991, 1992, 1997, 1998, 2001, 2002, and 2003
Describe the damage.	<ul style="list-style-type: none">■ Water damage to building and contents. As much as five feet of water some homes.■ Damage to fences, barns, and road grade.■ Loss of trees along Walnut Creek■ Erosion of land along Walnut Creek■ Damage to bridge and road on Springdale Rd.

Question	Summary of Answers Submitted
Have you done anything to your home to reduce future damage?	<ul style="list-style-type: none"> ■ Please describe: ■ Installed ceramic tile floors ■ Contouring, planting grass and mowing the drainage ditch. Reported that Precinct 4 dug out all of homeowners' work with bulldozer at least three times. ■ Reinforced the structure ■ Nothing that can be done ■ Would like to elevate guest house
In the last flood, did you have flood insurance?	<ul style="list-style-type: none"> ■ All but two respondents had flood insurance
Do you now have flood insurance?	<ul style="list-style-type: none"> ■ All but one respondent had flood insurance still maintains it
If you don't have flood insurance, why not?	<ul style="list-style-type: none"> ■ The one homeowner that has chosen not to maintain their flood insurance stated they, "Cannot afford to pay for something that is useless"
Is your business or place of work in the floodplain?	<ul style="list-style-type: none"> ■ Five respondents answered yes
If it has actually flooded, describe the damage.	<ul style="list-style-type: none"> ■ Two foot of water in the lower level ■ Marina, so it floats ■ Sewage came up from the bathroom – the whole store flooded
Please list roads where you've seen flooding.	<ul style="list-style-type: none"> ■ 1431 between Lago Vista and Marble Falls ■ Around the Hudson Bend area of Lake Travis ■ FM 973 ■ Man O War Ave ■ Citation Ave ■ FM 812 from Bastrop County line to Elroy Rd ■ Graveyard Point Rd ■ Bluecat ■ Center Point Rd ■ FM 973 ■ Burleson ■ Springdale Rd North of 290 ■ Bridges over Buttercup and Walnut Creek ■ Brandt Rd ■ Bluff Springs Rd
Describe other flooding problems you know about (such as flooded septic fields, water wells, etc.)	<ul style="list-style-type: none"> ■ Houses toward the rear of Citation Ave with effluent floating through them due to the subdivision sewer holding ponds and plant overflowing ■ Septic fields flooding out in neighborhood of Walnut Creek ■ Sheet water from Slaughter Lane
Please give us your ideas to reduce the impacts of flooding.	<ul style="list-style-type: none"> ■ Fix and add more cement drainage ditches ■ Clean and maintain current drainage ditches ■ Open Mansfield Dam flood gates earlier ■ Stop boat traffic on Lake Travis as soon as levels rise to avoid wave damage ■ In Walnut Creek; Improve bypass channel, scrap out rock and sediment buildup, install new rock gabions, and remove fallen trees
<p>Do you know about County permits? A permit is required if you want to:</p> <ul style="list-style-type: none"> ■ Build a new building (even a garage or shed), ■ Build and addition to an existing building, or ■ Make major renovations or repairs. 	<ul style="list-style-type: none"> ■ All respondents answered yes and several requested that Travis them more information about County permit requirements



Article published online by *In Fact Daily* (www.infactnews.com) after the February 11, 2003 public meeting:

2-12-03

County works on plan to mitigate flood problems

FEMA flood plain maps 20 years old

A team of Travis County officials and consultants should have a much better handle on the county's flood-prone areas in the next two months with the completion of a Hazards Mitigation Plan requested by the Federal Emergency Management Agency (FEMA).

Last night, consultants led the first of two public meetings on the planning process at Wild Basin. While FEMA has requested a mitigation plan that also includes the risk of winter storms and tornado winds, the real focus of the meeting was flooding. As consultant Rebecca Quinn explained to the handful of residents in attendance, the 20-year-old FEMA floodplain maps help, but they don't go far enough in describing the risk that 6,800 buildings face in Travis County's hundred-year floodplain.

That is about nine percent of the county's structures. Anecdotal evidence would suggest most of those are residential. Yet only 12 percent of the homes in the Travis County floodplain carry flood insurance, Quinn said.

"The best mitigation is to do it right the first time. If you can stay out of the flood plain, you should," said Quinn. "If you can't stay out of the flood plain, then you need to build it so it resists future damage."

Travis County has faced five disaster declarations since 1990, all of them related to flooding: the Christmas flood of 1991, the Lake Travis flood of June 1997, the Hurricane Georges flood of October 1998, the flooding of November 2001 and the flooding of Onion and Barton Creeks in July 2002.

The goal of the Hazards Mitigation Plan is to both recognize disaster-prone areas and address those areas with mitigation measures before disasters happen, Quinn said. The data gathered by the plan will also be used to provide more accurate information to justify a swifter response to disaster grant applications, according to consultant Jeff Ward. It will also help the county make a decision on whether to pursue more grant money for a buyout of homes on flood-prone Onion Creek.

Two major grants are offered by the state, Ward said. The Flood Mitigation Assistance Program, offered by the Texas Water Development Board, offers pre-disaster assistance to mitigate flooding problems. The Hazardous Mitigation Grant, offered by the state's Division of Emergency Management, gives post-disaster assistance.

The Hazards Mitigation Plan could provide more complete floodplain information, to tell a homeowner whether the risk from a flood would be six inches or six feet. It could also expand flood-warning systems or provide more public education on the location of the county's floodplain, so buyers can make educated decisions. The plan may suggest the need for engineering studies, but it will not suggest specific structural remedies for flooding problems, Ward said.

Homeowners Chris Corniere and Trent Chastain were both concerned about the Lower Colorado River Authority's actions on Lake Travis, where their homes are located. Both indicated that the LCRA had failed to move swiftly enough in anticipating storms and mitigating the possible damage to homes on the lake.

Stacey Schefel, the county's flood plain manager, said the LCRA must consider the entire watershed-not just Lake Travis-when it makes decisions to open and close dam gates. Quinn said decisions on lake levels were complicated by the many factors that need to be considered, including the needs of water users downstream.

Schefel said she was hopeful the county's data on its portion of the Onion Creek Watershed could be utilized for regional planning. Onion Creek, a 356-square-mile watershed, crosses county lines and city boundaries. She said Travis County must do a better job of coordinating with the other counties on the watershed, especially with Hays County where impervious cover could have a direct impact on the watershed.

The last time FEMA's flood plain maps were updated was 1982, although case-by-case adjustments are made to the map, Quinn said. The federal fiscal year 2003 budget includes \$100 million toward the \$900 million needed to update the maps.

A second meeting on the county's Hazards Mitigation Plan will be held at 6:30pm tonight at the Travis County Satellite One Town Hall, 9301 Johnny Morris Road. Interested residents may also download a survey on flooding issues at <http://www.co.travis.tx.us>. Quinn estimated that a final plan for county commissioners' review should be completed within the next two months.



Notice for Final Public Meeting published May 25, 2003 issue of the *Austin American-Statesman*

Notice of Public Meeting
Travis County Hazards Mitigation Plan

A public meeting will be held May 28, 2003, at 5:30 p.m. until 7:00 p.m., in the Travis County Administration Building, West 11th Street, Austin, Texas, Commissioners Courtroom, first floor, to review the draft Hazards Mitigation Plan recently prepared by Travis County. The draft plan may be reviewed by downloading from http://www.co.travis.tx.us/tnr/news/mitigation_plan.asp. Copies are also available for review at the following locations: Travis County Executive Office Building (EOB), 8th Floor Permitting Counter (512-854-9383) and the following Austin Public Library Branches: Faulk Central Library, Terrazas Branch, Southeast Community Branch, Little Walnut Creek branch.

The plan provides an overview of natural hazards in the County, summarizes past hazard events, describes how the County recognizes and addresses hazards in the development process and other County functions, and sets for an action agenda. The actions are intended to reduce the long-term impacts of flooding and other hazards on the County and its citizens. Members of the public are encouraged to attend, especially those with property located in flood-prone areas.

Citizens have the opportunity to comment on the plan and the proposed action agenda. Comments should be faxed to Melinda Mallia at 512-854-6474, or mailed to her attention at the Travis County Department of Transportation & Natural Resources (TNR), P.O. Box 1748, Austin, TX, 78767-1748.

After consideration of comments and review by the Texas Division of Emergency Management, the final hazard mitigation plan will be presented to the Commissioners Court for adoption this summer.

Questions about the plan should be directed to TNR's Mitigation Plan Consultant, Jeff Ward at 866-465-7105 (toll free number) or jeffreysward@earthlink.net. You can also contact Scheleen Walker, Travis County Executive Liaison/Planner at 512-854-9430.

Text of email received in response to public notice of availability of the Draft Plan:

From: "Joellen Simmons" <joellens@texas.net>
Sent: Friday, May 30, 2003 7:42 PM
Subject: Public Notice: Travis County Draft Mitigation Plan

Thank you for sharing the draft plan, which is located on the Web. Although the deadline for providing input was May 20, I hope you will share this with the Mitigation Committee.

I am a member of the neighborhood association at Onion Creek Meadows, which has landowners along the Onion Creek, of which is "part" of the plan, but not a targeted priority.

I was gratified to see so many agencies and organizations work together to form the "Mitigation Planning Committee- (B1), to develop this plan. It is sometimes very difficult to determine who is responsible for assisting landowners and the plan is a good first step. I understand that due to limited resources, priorities must be targeted for remediation of hazardless areas. I would however hope that the committee would consider assisting Neighborhood Associations to apply for and acquire Hazard Mitigation Grants that would prevent additional flooding and storm hazards that will prevent the eventual flooding in your targeted areas.

Prevention will of course target more than an individual, and should be provided to entities that will plan, implement and monitor structural additions that will focus on preventive measures within communities, thus preventing flooding at that location as well as downstream. Money provided for this will be more affective than short term fixes. Although you did not target our area as one of the priorities, it is crucial that you understand that the state of the land above your study, AT OUR LOCATION, substantially results in positive or negative, environmental situations downstream, resulting in the disasters you studied. Onion Creek Meadows, (along Onion Creek), at our location, upstream from Arroyo Doble, had limited homes flooded (three). However the erosion of the creek bed, and narrowing or its waters (upstream of the dam) located in our subdivision, has potentially and progressively set up precipitors for flooding. At our location, if the creek bed and the dam is not cleaned out, the sludge and gravel will continue to narrow the waterway here and downstream.

In the 25 years we have lived on the creek, the last five years have been unusual in that we have witnessed the creek narrow, due to storm and flood debris. Gravel has substantially re-aligned the creek from its original creek bed and will, in the future cause much flooding if it is not corrected. A large new tributary has begun to run (Garlic Creek) into Onion Creek as a result of gravel dump/re-alignment of the bed. Additionally, there is a neighborhood drainage ditch, that during storms, may cause further flooding, due to the narrowed creek, lacking room for the run-off flow into the creek.

It is very difficult to describe how destructive the creek is when we are in a dry spell, and I would further suggest that the committee get out and look for themselves how the creek flows DURING HEAVY FLOODING. I would be happy to sponsor such a site visit. I would hope the LCRA and TNRC will begin to plan proactively with Neighborhood Associations and substantially fund "Grants" to prevent environmental and flooding disasters.

joellen simmons, Manchaca, TX.

Appendix E

Additional Background

E-1 Austin/Travis EOC Activations

The EOC is activated in support of other events: hospital disaster drills, state hurricane drills, nuclear radiation exercises, airport exercises, chemical incident exercises. The following lists only activations associated with natural hazard events. The EOC is activated for civil unrest and terrorist incidents which have included the Gary Graham execution (2000), Fortune 500 protect (2000), World Trade Center attack (2001), anthrax threats (2001).

Date of Activation	Cause of Activation
12/1991	Christmas Floods (Presidential declaration)
2/9/1994	Ice storm
6/27/1996	Lake Travis Flooding
9/10/1995	Severe weather/wind storm
2/1-3/1996	Ice storm
9/20/1996	Severe weather
11/24/1996	Ice storm
1/7/1997	Ice storm
1/12-14/1997	Ice storm
2/21/1997	Lake Travis flooding
5/27/1997	Pedernales Valley, Jarrell, Cedar Park Tornado
6/10/1997	Southeast Travis County flooding
6/22/1997	Lake Travis flooding (Presidential declaration)
3/16/1998	Severe weather/flooding
5/5/1998	Train wrck/Williamson County – shelter operations
5/27/1998	Texas Forest Service/wildfires (State Disaster declaration)
10/17-18/1998	Central Texas flooding (Presidential declaration)
12/23/1998	Ice storm
3/15/1999	Severe weather/tornado warning
3/16/2000	Tornado warning (Travis & Williamson)
6/9/2000	Severe weather/flooding
11/2-3/2000	Severe weather – flooding
11/5/2000	Severe weather – flooding
12/12-13/2000	Ice storm
5/21/2001	Severe weather – high winds, Pflugerville
8/26-27/2001	Severe weather – flooding
8/30-31/2001	Severe weather – flooding
9/3/2001	Severe weather – flooding
11/12/2001	Severe weather warning – high winds
11/15-16/2001	Severe weather – Onion Creek flooding
6/26/2002	Severe weather – minor flooding & wind damage
7/1-5/2002	Severe weather – Lake Travis flooding (Presidential declaration)



E-2 Complete List of Watersheds and Floodplain Buildings

Watershed #	Creek Name	# Bldgs in SFHA	
		Co + Cities	County Only
1	Barton Creek	313	207
2	Bear Creek	70	70
3	Bee Creek	6	6
4	Bee Creek (Westlake)	44	25
5	Big Sandy Creek	182	148
6	Blanco River	5	1
7	Blunn Creek	47	
8	Boggy Creek	489	
9	Bouldin Creek	442	
10	Bull Creek	157	42
11	Buttermilk Creek	35	
12	Carson Creek	128	
13	Cedar Creek	12	11
14	Collier Hollow	55	5
15	Cottonmouth Creek	54	54
16	Cottonwood Creek	55	55
17	Country Club Creek	150	
18	Cow Creek	8	8
19	Cypress Creek	0	
20	Decker Creek	146	138
21	Dry Creek	73	
22	Dry Creek (Northeast)	1	1
23	Dry Creek (Southeast)	84	84
24	Elm Creek	68	68
25	Fall Creek	1	1
26	Fort Creek	464	
27	Gilleland Creek	263	166
28	Hamilton Creek	3	3
29	Harpers Branch	0	
30	Harris Branch Creek	129	128
31	Harrison Hollow	2	2
32	Honey Creek	2	2
33	Hucks Slough	0	
34	Hurst Creek	38	4
35	Johnson Creek	100	
36	Lake Austin	1317	146
37	Lake Travis	3033	2242
38	Lick Creek	2	2
39	Lime Creek	32	31

Watershed #	Creek Name	# Bldgs in SFHA	
		Co + Cities	County Only
40	Little Barton Creek	31	5
41	Little Bear Creek	4	4
42	Little Bee Creek	1	1
43	Little Walnut Creek	880	
44	Lockwood Creek	9	9
45	Maha Creek	166	161
46	Marble Creek	13	12
47	North Fork Creek	22	22
48	Onion Creek	2436	1113
49	Pedernales River	327	327
50	Post Oak Creek	8	8
51	Rinard Creek	1	
52	Shoal Creek	955	
53	Slaughter Creek	308	263
54	South Boggy Creek	218	69
55	South Fork Creek	125	125
56	Tannehill Creek	1082	
57	Taylor Slough	5	
58	Town Lake	975	713
59	Waller Creek	781	
60	Walnut Creek	1010	148
61	Wilbarger Creek	97	71
62	Williamson Creek	1675	10
63	Willow Creek	15	15
64	Yaupon Creek	21	
	Totals	19,175	6,725



E-3 Public Facility Assessment

Public Facilities Determined to be "IN" the Mapped Floodplain (using FEMA's Q3 digital flood data layer/GIS)

LABEL	DESCRIPTION	ADDRESS	Building Size (sq ft)
			Site Size (acres)
C1	Vehicle Services (<i>see below</i>)	1000 North Lamar	2100
C2	Hamilton Pool Park Maint Shed	24600 Hamilton Pool Road	350
C3	Bob Wentz Park Fee Booth	7144 Comanche Trail	80
C4	Bob Wentz Park Pavilion	7144 Comanche Trail	1256
C5	Moya Park Ranger House (<i>demolished</i>)	10001 Burleson Road	1800
C6	Moya Park Shelters (5 Total)	10001 Burleson Road	5696
C7	Moya Park Restrooms (3 Total)	10001 Burleson Road	2640
C8	Moya Park Office (<i>demolished</i>)	10001 Burleson Road	672
C9	Moya Park Maintenance Shed (<i>see below</i>)	10001 Burleson Road	1840
C10	Moya Park Concession/RR (<i>see below</i>)	10001 Burleson Road	1088
C11	Webberville Park Shelters (3)	2305 Park Ln	4800
C12	Webberville Park Restroom	2305 Park Ln	880
C13	Southeast Service Facility (<i>see below</i>)	5412 Lockhart Highway	
FS1	Fire Station #1108	1600 Citation Dr	
S1	Reilly Elementary	Austin IS District	10.768
S2	Ortega Elementary	Austin IS District	10.843



Name of Facility/Location: Vehicle Service Building, 1000 North Lamar (Map 5-4; Point C1)

Source of Flooding: Shoal Creek

Ground Elevation: 466'

Base Flood Elevation: 475"

Description: The Vehicle Service Building is a former gas and service station, continuing to provide mechanical services and fuel service for County vehicles. It is approximately 2,100 square feet in area with brick facing surrounding large display windows and doors, including 2 front bays and one side bay. Vehicles are parked adjacent to and behind the building.

The interior of the building contains equipment and furniture common to a gas and service station, onsite waste oil storage.

Fuel fill and protection? Any leaks or water into it?

Narrative Assessment:

Max depth of water experienced: +6'

Based on the Austin FIRM, the water depth during the 100-year event is predicted to be 11 feet.



Name of Facility/Location: Maintenance Shed, Richard Moya Park (Map 5-4; Point C9)

Source of Flooding: Onion Creek

Ground Elevation: 456'

Base Flood Elevation: 474' (mid-site)

Description: Corrugated metal single-story building, four double-wide vehicle bays, 1,840 sq ft.

Narrative Assessment: Based on the BFE selected mid-site, the predicted depth of water is on the order of 18 feet. Ground elevation is approximately 6' below the adjacent road level. No openings to allow inflow/outflow of rising/falling flood waters, but no evidence of damage (deflection of walls), suggesting no significant differential of hydrostatic pressure or forceful velocities.



Name of Facility/Location: Concession Building, Richard Moya Park (Map 5-4; Point C10)

Source of Flooding: Onion Creek

Ground Elevation:

Base Flood Elevation: 474' (mid-site)

Description: Block one-story building, total footprint of 1,088 sq ft, restroom facilities, small enclosure with metal door.

Narrative Assessment: elevated



Low part of facility that has flooded (looking downstream)

Name of Facility/Location: Southeast Service Facility; 5412 Lockhart Hwy (Map 5-4; Point C13)

Source of Flooding: Onion Creek

Ground Elevation: 490'

Base Flood Elevation: 491' (mid-site)

Description: Located just downstream of the highway, this facility is adjacent to Onion Creek but fairly high above the stream. A large above-ground fuel tank is located in the middle of the site. The lower portion of the site, occupied by open vehicle sheds, has experienced flooding.

Narrative Assessment: Although a portion of the facility is within the mapped floodplain, the facilities that are subject to flooding are not exposed to significant damage due to the nature of the buildings.



Tank considerably above area that has flooded in past.

Appendix F

Periodic Progress Reports

Annual status reports will be prepared, reviewed by the appropriate County officials, and forwarded to the Texas Division of Management and the Texas Water Development Board. The reports will be noted below and copies will be inserted in this appendix.

Comprehensive review and revisions to the Travis County *Hazard Mitigation Plan* will be considered on a 5-year cycle.

Date of Progress Report	Summary of Progress Accomplished

